

JUL 31 1920

SERIES 3—Vol. 3, No. 7

JULY, 1920

AMERICAN JOURNAL OF OPHTHALMOLOGY

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*Annual Subscription Ten Dollars in Advance,
Single Copies One Dollar.*

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY,
7 West Madison Street, Chicago, Illinois.

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.



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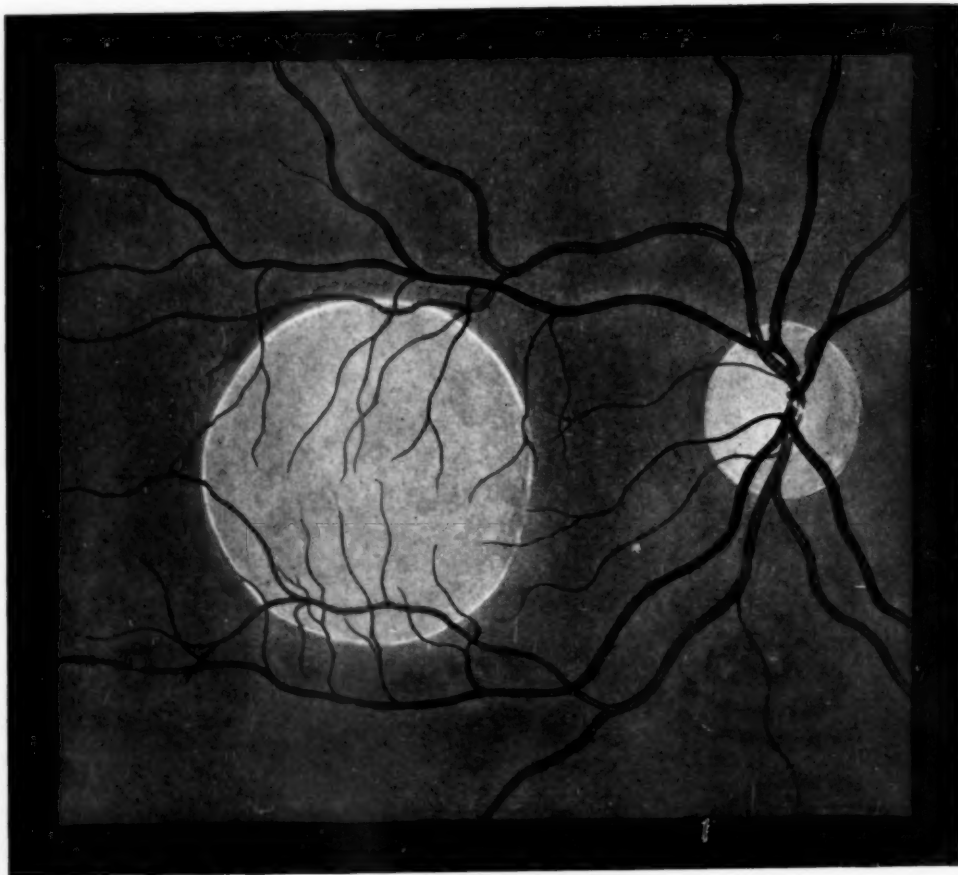
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PSEUDO TUMOR OF CHOROID. (JACKSON)

AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 3

JULY, 1920

No. 7

THE COORDINATION OF REFRACTION WITH SPECTACLE AND EYE GLASS FITTING

SIDNEY L. OLSHO, M.D.

PHILADELPHIA, PA.

This paper points out the importance of a fixed base line passing thru the external canthi for the 180° meridian. It describes a trial frame and methods for securing this base line and other advantages of exact placing of correcting lenses.

The art of refracting and that of spectacle and eye glass fitting are successive steps of a single process. I will show why there must be perfect co-ordination between them and that the therapeutic results will otherwise fall below our just expectations, following a careful refraction.

In order to coordinate the two parts of this process it is essential that there be established on the faces of patients

certain fixed points, which will first determine the position of the trial frame and trial lenses, and subsequently determine the position of the correcting lenses. I intend to define these fixed points.

I selected for my use the trial frame seen in Fig. 9. This frame has been improved, and, at my recommendation, several features essentially new to trial frames have been added. The purposes

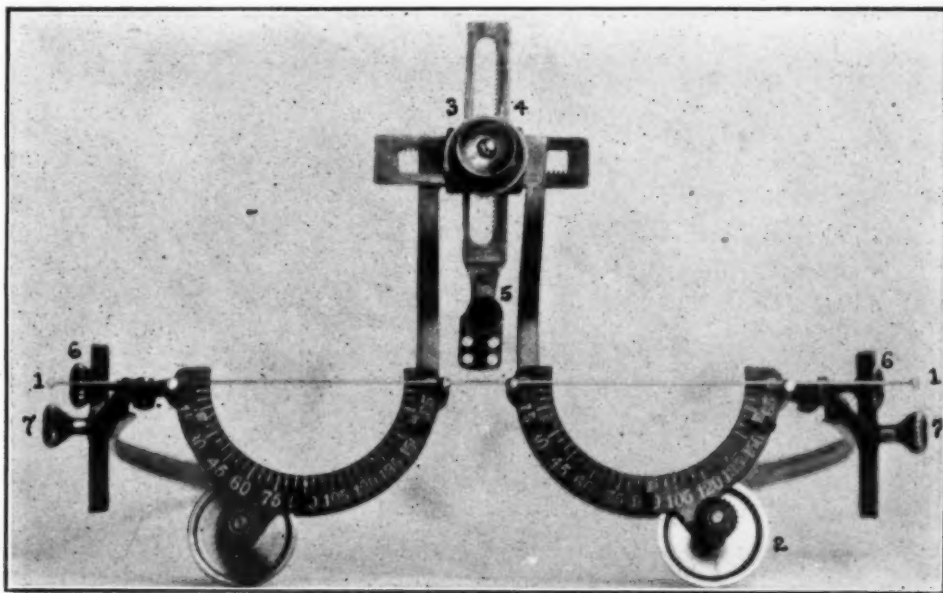


Fig. 1.—Rigid Front Trial Frame. (1) The 180 degree markings appear on both temporal and nasal sides for each eye, all four on one continuous line, as shown by the new horizontal test rod resting on four supporting pins. (2) Grooved friction wheel to rotate trial cylinders. (3) Ratchet wheel for centering right and left trial cells separately (one cell is never lowered separately). (4) Ratchet wheel for raising or lowering perforated conforming nose rest. (5) Ratchet screw for positioning nose rest forward or back. (6) Screw stem, one for each temple, controlling its spread, insuring even tension on both sides of head and the distance of both cells from the eyes. (7) Ratchet and wheel device for delicate control of the new, separately adjustable tilting temples. Tilt one temple only and the corresponding end of the trial frame is raised. Tilt both equally and the trial frame front is tilted forward from the top.

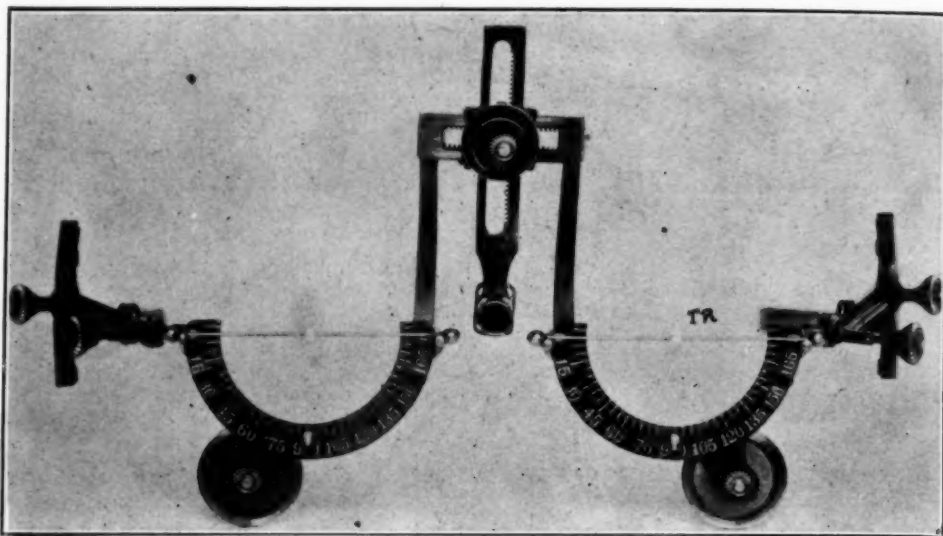


Fig. 2.—Each one of the short horizontal test rods (TR) should be opposite an external canthus when frame is correctly levelled.

of these new features will presently appear. The accompanying figures 1, 2 and 3 show the new frame in detail, attention being called only to its most characteristic features.

In order to coordinate refraction

with the fitting of spectacles and eye glasses, it is primarily necessary that a definite base line be employed as the 180 degree or horizontal meridian of the patient's face. Let it be understood that this line extends invariably from

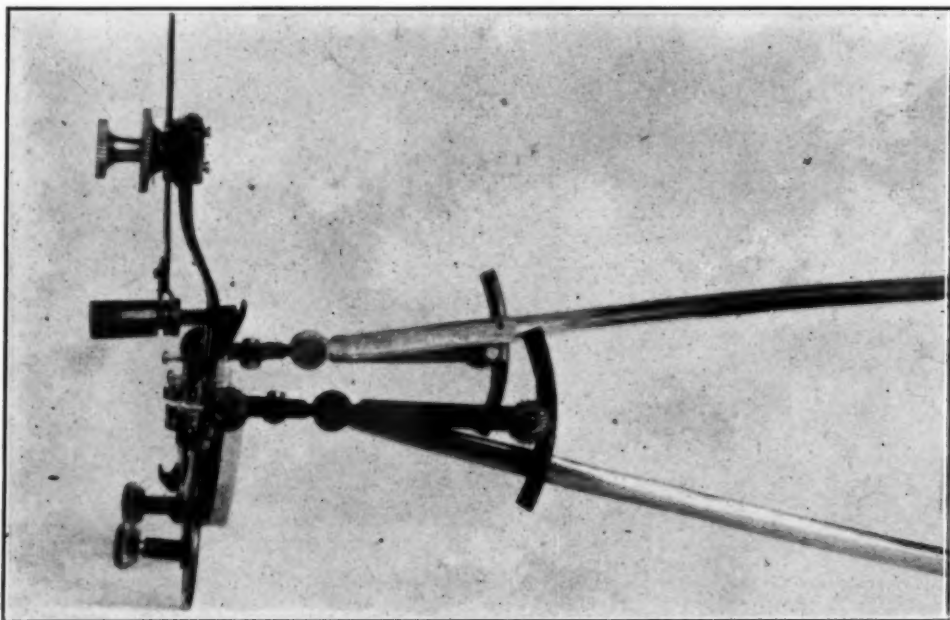


Fig. 3.—When one ear is higher or the face asymmetric it becomes necessary to tilt one temple more than the other, in order to bring the continuous horizontal line of the trial frame from opposite and parallel to the line extending from external canthus to external canthus.



Fig. 4.—Patient's right ear is slightly the higher, hence the continuous horizontal line of the trial frame is too high on the right side.

the external canthus of one eye continuously to the external canthus of the other eye. The internal canthi are to be disregarded. Here then is a constant, definite, continuous base line between two fixed points, in fact, the only lateral fixed points available. It does not vary from day to day. The line is the same in all patients regardless of facial asymmetry or any kind of ocular deviation. The worse an asymmetry or a deviation, the more necessary are fixed

points from which to work off one's axes and to which to fit the glasses. In the majority of cases the line actually does cross corresponding levels of the two corneas.

The eye balls are not fixed points. The pupils are therefore not stationary. They cannot serve constantly and invariably as landmarks for a *fixed base line* or 180° meridian for both the trial frame and the finished spectacles or eye glasses. They cannot serve because their positions are

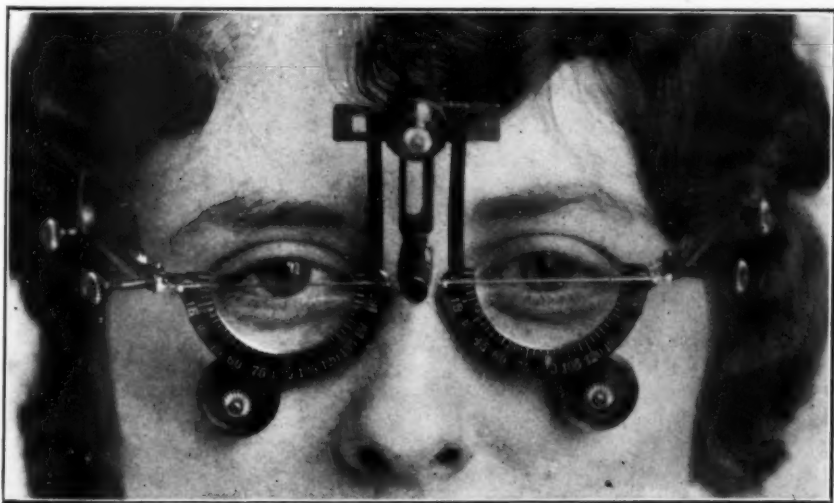


Fig. 5.—The defective position shown in Fig. 4 is corrected by a slight turn on the right Temple-Tilting Ratchet-Control. Continuous horizontal line of trial-frame point is now opposite and parallel to the line extending from external canthus to external canthus.

altered by every movement of the head, because ocular deviations and nystagmus are common, because pupils are often irregular, unequal and displaced.

Heretofore no attempt has been made or any equipment designed, definitely to coordinate the 180° meridian of the refraction table with the 180° meridian of the spectacle and eye glass fitting table. Let us put this new equipment into practical application.

Figure 4 shows the trial frame on the face of a patient to be refracted. The

Now place any two perfect trial cylinders in the frame at axes 180° . (Fig. 6.)

Note how their axis markings coincide at all points with those on the frame. These cylinders will also be true at both poles at any other axes to which they may be turned.

At this point let us suppose that we have to refract a patient with a decidedly asymmetric face. See Fig. 7.

Many skillful adjusters take a look at a face like this, which has more or less irregularity of facial contour and decide

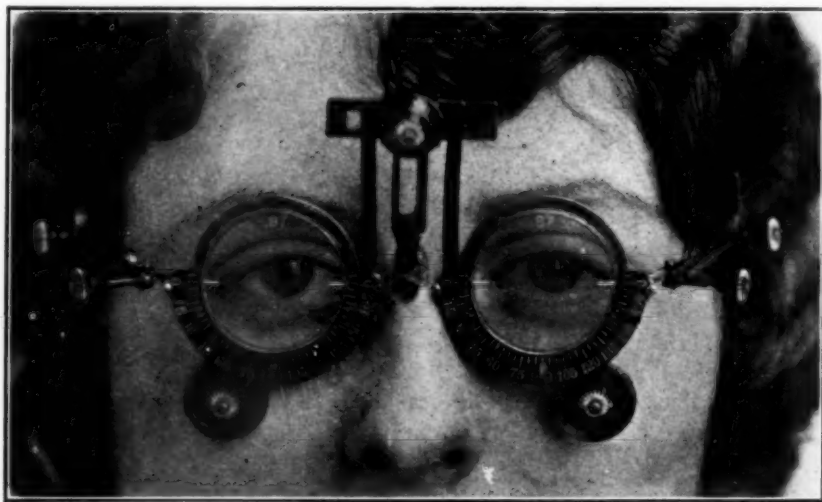


Fig. 6.—The four 180° degree axis markings of the two perfect trial cylinders, coincide with the four 180° degree markings on the trial frame. They will be true at both poles at any other axis to which they may be rotated.

horizontal test rods show that the four 180° degree markings on the trial frame are on one continuous line, as they should be. The right ear of this patient is slightly higher than the left. Hence the right test rod is somewhat higher than the patient's right external canthus. The frame is not yet positioned exactly right.

The slightly inaccurate position of the trial frame on the patient shown in Fig. 4 is corrected by a slight turn of the temple-tilting ratchet-control which brings the horizontal line of the trial frame into the correct position shown in Fig. 5. Now each rod crosses an external canthus. The frame is in correct position as far as the 180° meridian is concerned. The rods are withdrawn.

that one eye is higher than the other. Accordingly they establish two horizontals at different levels, adjusting the spectacles or eye glasses according to this conception. Such are working with absolutely no basis. The horizontals they establish are at *right angles to an indefinite line guessed to be the vertical meridian*. The oculist may not have used the identical lines when deciding the cylinder axes. A new optician may make a new guess. There is no coordination. A glance at Fig 7 will show that a cylinder prescribed at an axis of, say 105° , can have more than one position according to the taste of the optician.

One very high priced trial frame is on the market which permits the lowering or raising of one trial cell independently of

the other. It establishes two different levels for the horizontal meridian. With it, refracting may be done from one indefinite horizontal, and the adjustment made at some other horizontal.

In an endeavor to give the satisfactory result expected from the prescriptions of eminent oculists, it is quite common for very careful dispensing opticians to experiment a little in their adjusting of high cylinders. All opticians, however, are not so solicitous.

It is also the custom of some very careful oculists to determine the axes of high cylinders with two or more different trial frames and to prescribe at an intermediate axis. I propose to eliminate these sources of uncertainty and error.

Just how difficult it is to decide how to place the ordinary trial frame on this patient with an asymmetric face is apparent in Fig. 8.

One ear slightly or even considerably higher than the other is of extremely frequent occurrence. The resultant defective position of this trial frame, which is probably the one in most common use, may escape notice entirely. If discovered however, its position can be corrected only by bending down one of the bows of the trial frame or by placing cotton on top of the patient's low ear.

Fig. 9 shows him with another trial frame unequipped with the test rods or the separately adjustable tilting temples.

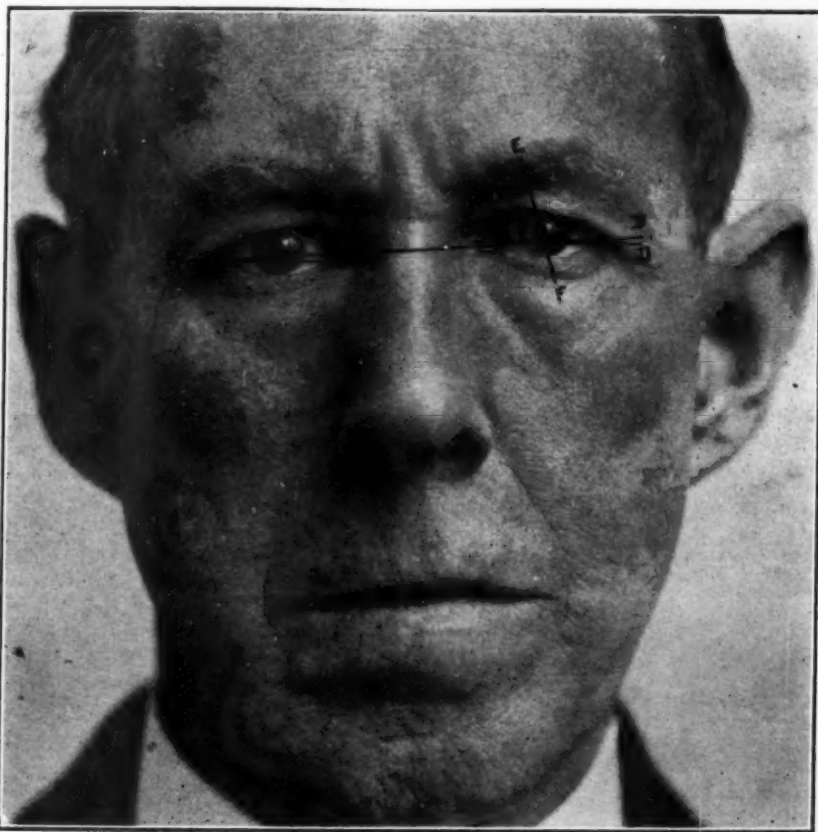


Fig. 7.—Patient with decidedly asymmetric face. The left eye appears to be higher than the right. The lines show that a cylinder prescribed at axis of 105 degrees might, in this case, have more than one position according to the habit of the optician. The line EF cannot form an angle of 105 degrees with both lines CD and AB. The continuous line AB is the one to which the continuous horizontal line of the trial frame, as well as the continuous horizontal line of the prescribed spectacles must always be opposite and parallel.

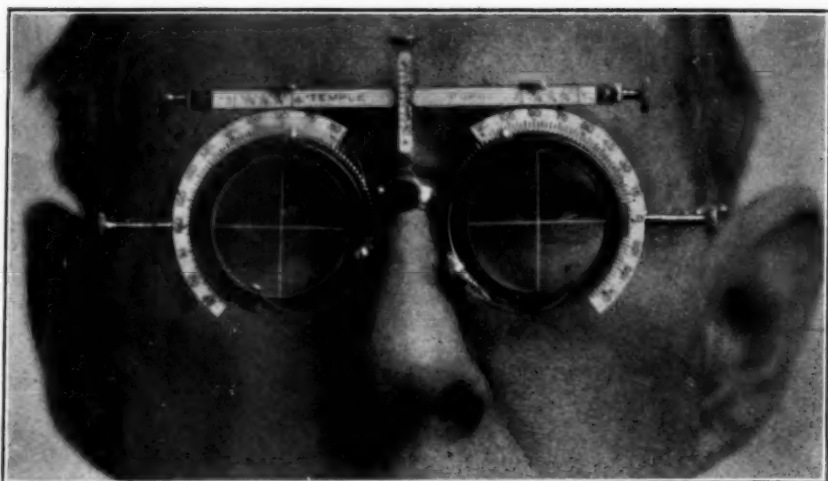


Fig. 8.—Shows the impossibility in this case of securing a satisfactory position for the trial frame probably in most common use.

Without the latter the frame cannot be levelled.

Fig. 10 shows the problem solved in this case, with the new trial frame so adjusted by means of the separately adjustable tilting temple device, that the continuous horizontal line of the trial frame is brought exactly opposite and parallel to the horizontal line of the face, which extends from external canthus to external canthus.

Fig. 11 shows this patient properly fitted with a straight front pair of spectacles. Each of the round lenses in this frame is marked by two diamond dots, one near each end of the 180° meridian of each lens. White pencil lines have been drawn between the dots. All these four dots fall exactly on one line. This line crosses each external canthus.

In this case refraction has been perfectly coordinated with the spectacle



Fig. 9.—Shows patient with new trial frame but without my separately adjustable tilting temples or the pins to support test rods. With this frame, too, there is no certainty that the cylindric spectacle lenses will occupy the same relative position to the eye as the trial cylinders

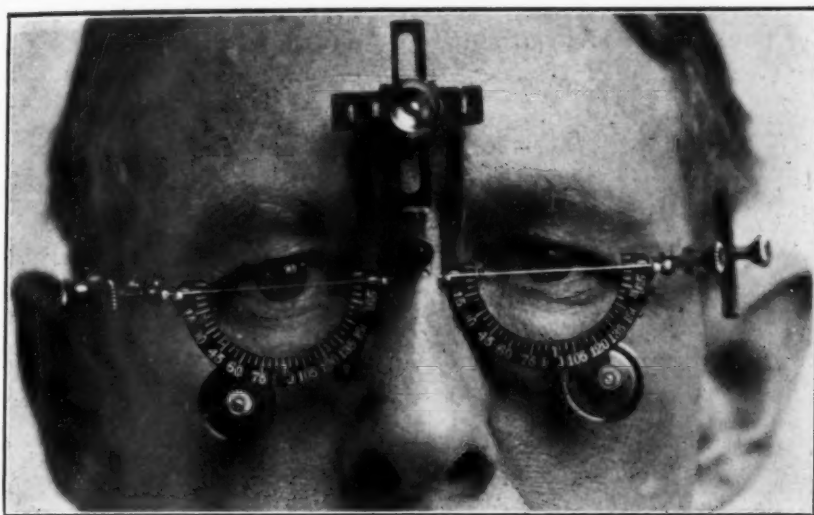


Fig. 10.—By delicate manipulation of the separately tilting temples, the trial frame is now positioned so that each test rod appears opposite an external canthus. The continuous horizontal line of the trial frame is opposite and parallel to the continuous horizontal line of the face. Now it is certain that the cylindric spectacle lenses will occupy the same relative position to the eyes as the trial cylinders. Coordination of axes.

fitting. The horizontal line of the spectacles coincides with the horizontal line of the trial frame and both coincide with the horizontal line of the face.

Height.—The horizontal base line previously designated, determines also the height of the centers of the trial-

frame lenses, and it predetermines the height for the centers of the lenses of the finished spectacles or eye glasses, as shown by white pencil lines across their horizontals, each opposite an external canthus.

Lenses so positioned are found to be

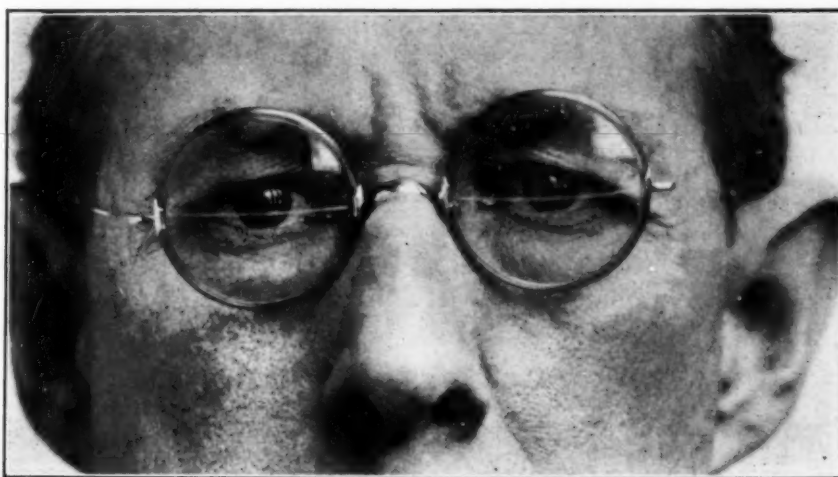


Fig. 11.—Patient properly fitted with a straight front pair of spectacles. Each of these round spectacle lenses is dotted with two diamond dots, one near each end of the 180 degree meridian of each lens. White pencil lines have been drawn between the dots. All these four dots would fall on one continuous line. This line crosses each external canthus. The continuous horizontal line of the spectacles coincides with the fixed horizontal line of the face.

placed centrally before the natural bony orbital aperture as seen in Figures 16, 17 and 18.

The position I insist on is much higher than the one to which opticians seem accustomed to adjust lenses. My lenses also have more tilt and are closer to the eyes. I have had to battle with opticians to get high adjustments, and yet I find that the line to which I refer is no higher than the lower margins of the undilated pupils.

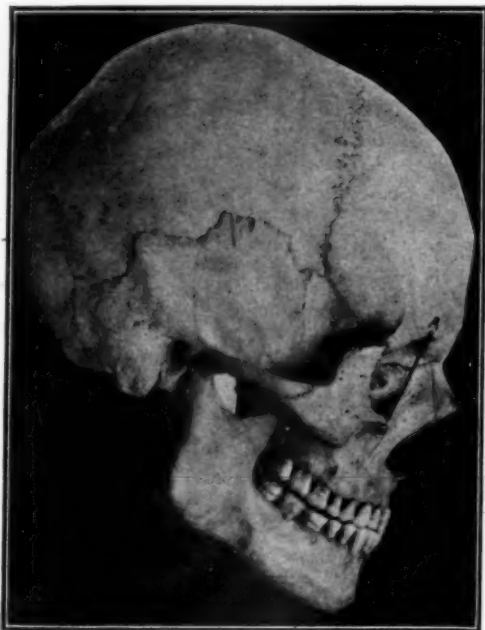


Fig. 12.—The line AB indicates the correct tilt for the lenses of the trial frame, also for the correcting lenses in spectacles or eye glasses.

The bridge of spectacles, be it metal or shell, must be so constructed that it can rest on the natural first little bend of the nose, even if this is low. The shanks of a metal bridge must carry the lenses thence upward to the proper level. A shell or zylonite spectacle crest can also be placed sufficiently low on the frame so that, no matter how flat the nose be, the right height of the lenses may be obtained. No amount of tightening or shortening of the spectacle bows will combat the force of gravity if the bridge shanks do not raise the lenses sufficiently. No bridge will rest on a vertical surface.

View the wearer's profile. If spectacle lenses are at the correct height the spectacle temple will be seen to cross the external canthus, as in Fig. 15, and this is the height at which the refraction is to be done.

By insisting on this high position I have given innumerable patients that comfort which they have constantly sought for themselves, by habitually pushing their glasses upward; I have contributed greatly to the improvement



Fig. 13.—Shows trial frame so adjusted by means of delicate tilting temple device that the plane of the trial lenses is exactly parallel to the bony orbital aperture, or the imaginary line AB.

of their personal appearance with glasses; and have permitted them to use their eyes, most nearly in the primary position.

Lenses for reading or close work exclusively, may be slightly lower, but not much. They must also be given a greater tilt.

My new trial frame admits of exact adjustment as regards height and tilt; for height, by means of a central wheel; for tilt by means of the adjustable tilting temples. The tilting of both temples together tilts the trial frame front.

Of the correct tilt for lenses used con-

stantly, I will presently have more to say; meanwhile I would call attention to this fact, which, in connection with both height and tilt of lenses, must be given due consideration. Patients bring the depressors of the eye ball into action much more while the eyes are being tested than at other times. Ordinarily a book or paper is elevated, while at desk or lap work the individual inclines the head, neck and back sufficiently so that the eyes may be used in the position of

A B on Figure 12. This is the natural bony orbital aperture.

We must begin however, by doing the refracting with the trial lenses in this correctly tilted position. To do this both temples of the trial frame must be given a sufficient downward slant, as has been done on the patient shown in Fig. 13.

It is essential therefore, that the trial frame be one which permits of this adjustment. The nonadjustable angle at



Fig. 14.—The result aimed at, the correcting lenses parallel to the line AB, the bony orbital aperture.



Fig. 15.—Shows correcting lenses in the same relative position as the trial lenses shown in Fig. 13, and parallel to the imaginary line AB of Fig. 12. Coordination of tilt. That the height is correct is shown by the spectacle temple crossing the external canthus.

greatest ease, namely as nearly as possible in the primary position (undepressed).

Tilt.—The obtaining of the correct tilt for ophthalmic lenses is not to be a matter of chance, or left to the personal taste of the optician who happens to do the fitting.

Nature has supplied bony landmarks for this adjustment. Lenses that are to be worn constantly should be parallel to a line extending from the center of the upper, sharp, thin, bony rim of the orbit to a corresponding point on the lower sharp, thin, bony, orbital rim. They should be parallel, namely, to the line

which the most commonly used trial frame sets, is usually not the right one, even for distant testing. The tilt of the trial frame is not correct unless it coincides with the one that the correcting lenses are to have.

The tilt I prescribe for constantly used lenses seems to be greater than that which opticians are in the habit of giving. My lenses are also brought much nearer to the eyes and are placed higher than in the ordinary run of adjustments. While tilting temples for the reading test have been provided in some trial frames, for instance in the "Genophthalmic"

frame, they are not susceptible of delicate separate adjustment. They were not devised, nor can they be used for the purpose of leveling the trial frame front to a certain fixed-base-line-position, or for the purpose of fixing the trial lenses parallel to the orbital apertures in distant testing.

Having completed a refraction with the new trial frame, with trial lenses in the correctly tilted position, we must

By means of two central adjusting wheels on the new trial frame, the eyes may be separately centered, using cross line trial lenses or the centrally beaded short horizontal rods. Subsequently the prescribed correcting lenses are to be similarly centered.

In the new equipment the trial lenses are thin. There is very little space lost between sphere and cylinder. The trial lenses are adjusted as close to the eyes



Fig. 16.—Whether spectacles or eyeglasses are worn and in all cases the conception of the axes of the lenses should be analogous to that in the figure. The cylinder axis XY forms an angle of 105 degrees, not only with the segment CD, but with the entire line AD. The line AD is always a straight line and is always opposite both the external canthi.

next see that the correcting lenses be given the identical tilt. Fig. 14 shows the result aimed at, the finished lenses parallel to the line A B, the bony orbital aperture.

Fig. 15 shows the patient with spectacle lenses at the correct tilt, their planes parallel to the imaginary line A. B. Coordination of tilt. The same tilt can be obtained with eye glasses.

INTERPUPILLARY DISTANCES AND DISTANCE FROM CORNEAS

Authorities are in accord that the optical centers of correcting lenses should fall on the visual lines. Hence the distance between the optical centers of correcting lenses should actually be somewhat less than the distance between the patient's pupils, as opticians measure.

as possible and considering that they have also the correct height and tilt, the distance of the test lenses from the corneas may be made to coincide almost exactly with the distance which the prospective correcting lenses will have from the corneas. I need not dwell on the importance of these coordinations.

Having established that position for my trial lenses which I expect my correcting lenses to occupy, I leave the positioning of the latter to no uncertainty. My opticians are instructed. I educate my patients too, so that they are satisfied only with the highest standard of manufacture and the most painstaking adjustments.

Both lenses in either spectacle or eye glass frames are marked with two diamond dots on the posterior surfaces,

one near each end of the 180° meridian of each lens. In frameless spectacles the screw holes serve as these points. In frameless eye glasses drilled in centre, one dot on each lens is sufficient. If drilled above centre, two dots are required on each lens, marking the 180° meridian at both ends of each lens. If one lens be a sphere and one lens a cylinder, I require nevertheless that both lenses be dotted on the 180° meridians. My reason for so doing is set forth under Fig. 16.

1. It is frequently crooked.
2. The axis scale is as a rule too short. It does not immediately reveal, as it should, its own crookedness or faults in the markings of the trial cylinders.
3. It is rigid only when brand new.
4. The cells permit the lenses often to be placed in faulty positions.
5. There is no provision to guard against the error resultant from one ear being higher than the other.
6. The trial lenses, as a pair, can not



Fig. 17.—The position of the trial frame and the trial lenses predetermines the position of the correcting lenses. In every instance, the white line shown in Figs. 17 and 18 must be drawn when the first adjustment is made. For every readjustment it is absolutely essential that the horizontals, between the ever-present dots, be marked by a white line.

• When glasses are to be adjusted or to be readjusted, I require that opticians connect the diamond dots indicating the horizontal meridians by a white pencil line. The glasses are then to be set, so that this line passes out at each external canthus. The first fitting requires in addition, vertical white pencil lines thru the geometric centres of each lens. These verticals must appear opposite the pupillary centres.

The accompanying figures 17 and 18 show glasses white-pencil-marked and adjusted.

THE TRIAL FRAME.

The commonest faults of the ordinary trial frame are:

be tilted to a position parallel to the bony orbital apertures.

7. A few trial frames, only, give any tilt for reading.

8. The ordinary trial frame is provided with no adjustment of the temples to correct a tendency of one cell to be nearer the eye than its fellow, except by shortening a temple to pull harder on one ear.

9. It does not permit perfect co-ordination of refraction with spectacle and eye glass fitting.

My new trial frame, not only overcomes the preceding list of faults but has the following additional advantages:

1. Absolutely rigid front.

2. Axis scale shows all four 180° markings always on one line, as shown by a straight horizontal test rod.

3. Four pins to support a single long, or two, short, straight, centrally beaded horizontal test rods.

4. Adjustment to bring one cell nearer the center line than the other but *no adjustment to move one cell to a lower parallel than its fellow.*

5. Lateral adjustment screws for temples, insuring even lateral pressure and the equidistance of both trial cells from the eyes.

6. Delicate ratchet adjustment for tilting the temples separately or together. Used together the trial lenses are tilted so that their planes may parallel the bony orbital aperture, or so that they may be tilted more for the reading test. Used separately the horizontal straight line of the trial frame is made, in every instance, to coincide with the horizontal straight line of the face.

7. Thin lenses are used with little space between s_1 here and cylinder.



Fig. 18.—The verticals and horizontals should be marked for the first adjustment. The horizontals must be marked for every readjustment.

Other details concerning the Requisite Attributes of Properly Fitted Spectacles and Eye Glasses are referred to in a previous paper. Penna. Med. Journal, Dec. 1918.

WASP-STING KERATITIS, WITH SPECIAL COLOR CHANGES IN THE IRIS

DR. Y. YOSHIDA

KYOTO, JAPAN

This report from the University Eye Clinic, of Professor Ichikawa, throws light on the characteristic changes produced by this rare but important injury. Translated from the German by S. R. Gifford, M. D.

The ocular changes provoked by bee and wasp stings are quite varied. Cases with stings of the lids have been reported by Zander-Geissler (1864), Hilbert (1904), Gepner (1907), Kraupa (1911), Purtscher (1911), and Orendorff (1911). Among these, in the cases of Gepner, Kraupa and Orendorff, there occurred also a keratitis, which took place secondarily by extension of the sting to the conjunctival surface.

Direct trauma to the cornea by wasp and bee stings is noted by Krieg (1842), Purtscher (1895), Gallemaerts (1896), Lewin and Guillery (1904), Lepplat (1894), Kaufmann (1904), Joachim (1904), Huwald (1904), Luniewski (1906), Kusama (1913), Koyanagi (1920).

As rare changes, Hilbert and Lewin-Guillery noted discoloration of the iris (the first, greenish discoloration of the iris); Huwald and Kaufmann clouding of the lens; Lundy acute glaucoma; Koyanagi acute glaucoma and cataract.

The literature of bee and wasp stings of the eye, aside from the last mentioned changes, which are of rare occurrence, is therefore seen to be already extensive enough so that a further communication might be considered as hardly necessary.

Concerning the pathologic anatomy, however, this is not exactly the case. For example, we know nothing as to the cause of the peculiar bluish discoloration of the iris. Huwald, Langer, Nagano-Oda, and Koyanagi have, indeed, investigated pathologic changes after wounds of this kind by the experimental method; and have, in a praiseworthy way, brought much to light. Of the cause of the iris discoloration, however, they have made no mention, as they did not succeed in producing this interesting bluish discoloration experimentally.

Recently I have had occasion to observe a case of keratitis due to wasp sting, in which, besides the corneal changes, bluish discoloration of the iris occurred. A piece of the iris so affected was secured, and was used for microscopic examination. I take the liberty of communicating the results of histologic examination of this piece of iris.

CASE.

The case concerned a forty-six year old farmer. The accident took place on September 24, 1919, when a wasp suddenly struck his left eye. Pain, lachrimation, and swelling of the lids followed at once, which disappeared after about twelve hours. The next day, however, he found that vision was poor in the left eye. He was brought to our clinic on October 25th.

PRESENT CONDITION.—The patient is a well-built man. The skin is of normal color, and shows no pathologic changes aside from moxa scars on the back. Cervical and cubital lymph nodes not swollen. Internal organs are likewise intact. Urinalysis negative. Appetite good.

OCULAR FINDINGS.—Ocular movements are free. The left palpebral fissure is narrower than the right, since the skin of the lids was somewhat reddened and swollen. However, even on closer examination of this region, no remains of the sting could be seen. Lacrimal sac intact. The palpebral conjunctiva shows nothing abnormal, except slight hyperemia. The bulbar conjunctiva is only slightly injected around the limbus.

The cornea shows in its entire extent a diffuse grayish opacity; which on examination with the loupe is seen to consist of numerous fine points, and which is more opaque in the center than peripherally. The single points are both

superficial and deep. The opacity shows no formation of new vessels. The whole surface of the cornea presents fine inequalities, and in the middle, a few vesicles from milium to pin-head size. A foreign body is not found in the cornea, tho I searched for one carefully with the loupe. The striate opacity of the cornea mentioned several times in the literature is not observed. The sensitivity of the cornea is wholly obliterated.

is impossible on account of the corneal opacity.

The lens shows in its center a superficial, irregularly outlined localized opacity. From the pupil a red reflex is barely obtained. Tension minus. L. V. —Fingers at two feet, not improved by glasses. Projection good.

The right eye has normal vision and shows nothing pathologic; the iris particularly shows a brownish color.

As treatment, hot applications, 5%

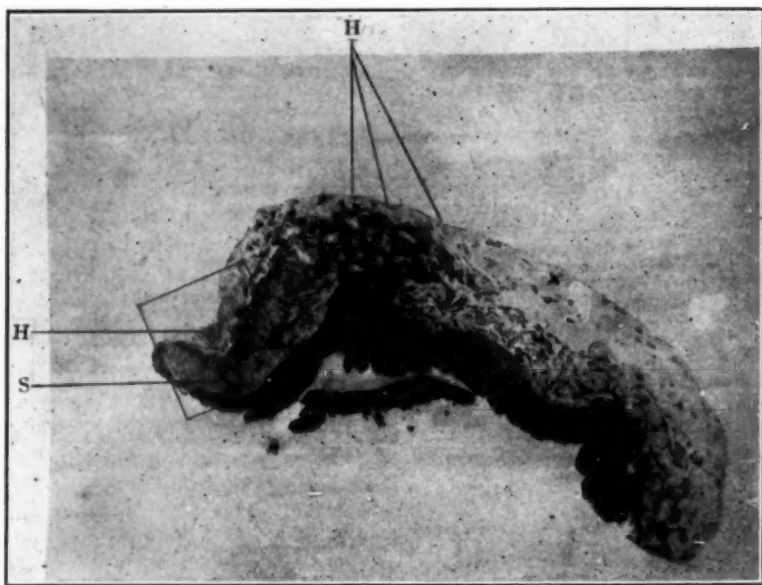


Fig. 1.—Section of iris removed for wasp sting keratitis seen with Leitz oc. 1, ob. 5. HH, hyaline masses on free surface of iris. S, Sphincter, partly denuded of anterior stroma. X, Swollen stroma.

The sclera is intact. The anterior chamber is of normal depth, and shows no hypopyon. The pupil is about 7 mm. in diameter (atropinmydriasis), perfectly round and shows no posterior synechiae.

The most striking change in the iris is its bluish discoloration. This is the more notable as the iris of the other eye is of a brownish color. The peripheral part of the iris on the affected side, however, showed a brownish color, this part has thus been spared by the pathologic change. The markings of the iris appear more or less notably washed out; but its exact examination

dionin ointment, subconjunctival injections of Na.Cl., a pressure bandage, etc., were employed. By these means the corneal opacity was somewhat improved. But there remained in the center a dense opacity, in which vesicle formation frequently recurred, without, however, any accompanying increase in tension.

Two weeks after admission, blood vessels appeared in the deeper layers of the cornea. The pupil remained dilated and did not react to light, tho no more atropin was employed.

On December 4th, an optical iridectomy was done above, and on Decem-

ber 5th, the patient was discharged with vision fingers at 2 feet.

The fragment of iris secured measured 2 mm. in breadth by 1.5 mm. in height. It was at once fixed in 10% formalin, embedded in celloidin and cut serially in sagittal sections.

MICROSCOPIC FINDINGS OF FRAGMENT OF IRIS.

The striking finding to be observed in the iris is the absence of its anterior

Another noteworthy finding is the presence of a peculiar hyalin-like mass on the free anterior surface of the iris. (Fig. 1. H_1 H_2) The latter shows a flat configuration, is about $.3\mu$ to 1μ thick, is firmly adherent here and there to the surface of the iris, is larger towards the pupil than towards the ciliary region, and is in many places turned forward at both ends, or curled over. (Fig. 2. H_1). At the places where it shows a deepening on the surface of the iris,



Fig. 2.—Portion of iris section included in square marked on Fig. 1. Enlargement Leitz oc. 1, ob. 7. H, Hyaline mass on anterior surface. V, Vacuole in sphincter tissue.

limiting membrane, together with its endothelium; so that the vascular layer is laid bare. (Fig. 1.) In several sections I observed at the pupillary border the sphincter laid entirely bare. The remaining tissue of the anterior stroma, now limited anteriorly by the free surface and extending posteriorly directly to the vascular layer proper, is unusually swollen; so that the characteristic reticular structure of this tissue can no longer be made out. (Fig. 1.x.) It has, on the whole, a smooth surface, but in parts presents deep furrows, and stains much less deeply with eosin than the vascular layer beneath.

it penetrates wedge-like into the iris. It stains red with eosin, yellow with Van Gieson-Weigert, violet red with Russell's stain, pale blue with Weigert's fibrin method, rose red with Loele's stain, and violet red with Papanheim's methyl pyronia green.

In general, it appears homogeneous, but contains here and there shrunken nuclei of leucocytes and pigment granules; and is sharply differentiated from the underlying iris tissue. In places it appears more or less distinctly divided into leaves or processes, and shows small lacunae, which are chiefly placed with their long axes parallel to the iris

surface. It is, however, nowhere reticular.

In other respects the iris tissue presents a normal appearance; nowhere is pathologic engorgement of vessels and inflammatory invasion of leucocytes to be seen. The vessels themselves are likewise unchanged. The posterior limiting membrane and pigment cells of the pars iridica retinae are normal. The sphincter muscle is, as already mentioned, partially denuded of its covering anterior stroma layer, so it is left bare in places. (Fig. 1. S.). Its muscular tissue appears somewhat swollen and encloses many vacuoles; its nuclei, however, take the stain well. (Fig. 2. V.).

COMMENT.

That the peculiar bluish discoloration of the iris in the present case is the direct result of wasp sting, and does not concern a so called heterochromia, is clear enough from the above described histologic findings. Of these, the following are to be emphasized as especially important:

1. The absence of the entire superficial structure, of the anterior stroma layer.

2. The presence in places of peculiar hyalin-like masses on the free surface of the iris.

The staining properties of the latter are not, as above mentioned, quite typical for hyalin. That they cannot, however, concern fibrin which has exuded onto the iris surface, is apparent from their flat form, homogeneous appearance and nonreticular structure. Against this, also, is the fact that the ocular changes evoked by bee and wasp stings are predominantly of a degenerative type. The lens opacity in bee and wasp sting is, for example, not to be considered as belonging to the usual picture of traumatic cataract. The vesicle formation on the corneal surface must have its origin in degeneration of the epithelium.

Huwald in his experiment found necrosis of the anterior iris endothelium, without, however, any discoloration of the iris. Nagano and Oda also describe a necrotic change of the

endothelium on the posterior surface of the cornea in wasp sting. It might be well claimed from this that the superficial tissue of the anterior iris stroma was in the present case first changed by the toxic action of the wasp sting into a hyalin-like mass; then separated by spaces from the tissue beneath, divided into numerous small fragments, and finally thrown off into the anterior chamber. Whether the hypopyon in the anterior chamber mentioned in the literature in bee and wasp stings may arise, not at all from pus cells, but consist of this necrotic, cast off, hyalin-like iris tissue and endothelial cells, is not clear. In any case it is highly desirable in the future, to investigate microscopically the contents of the anterior chamber in cases of bee and wasp sting keratitis with hypopyon, in order to approach a solution of this problem.

The question now arises, whether the anatomic changes found in the iris are of a nature to explain satisfactorily the bluish discoloration of the iris observed clinically. This, I believe, may be justly affirmed. The iris color among us Japanese is well known to be usually brownish. That this brown color of the iris is due entirely to the richness in pigment of the iris tissue in Japanese, as opposed to the scarcity of pigment in the irides of Europeans, which are usually of bluish color, is true beyond a doubt. It is, therefore, quite intelligible that it should appear blue, like that of Europeans, when robbed of its richly pigmented anterior stroma layer, it becomes poorer in pigment. In Hilbert's case, the greenish discoloration of the iris had disappeared a week after the accident. This restoration of the normal condition in Hilbert's case is obviously not in accordance with my finding; since the iris change in my case is of an irreparable nature.

Finally there remains to be determined the cause of the mydriasis which, together with the iris discoloration, presented during the whole period of observation, one of the most striking symptoms. I found the development of vacuoles in the pupillary

sphincter. It is not to be proven out of hand that this change might be the cause of the mydriasis. On the other hand, it is not impossible that the nerve fibers, as well as the sphincter,

are affected by the wasp's toxin, and so produce the dilatation of the pupil. The insensitivity of the cornea might also well be traced to lesions of the nerves due to toxic action.

APPARENT SYMPATHETIC OPHTHALMIA, NINE MONTHS AFTER ENUCLEATION, WITH IMPLANTATION OF GOLD BALL IN TENON'S CAPSULE.

DAVID N. DENNIS, M.D.,

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In this case recurring attacks of inflammation and increased tension in the remaining eye cleared up under general and local medication without removal of the implanted ball.

The following case shows several interesting features:

A sympathetic secondary glaucoma, starting nine months after enucleation.

The irritating eye removed within two weeks of injury.

The recurrence of these attacks of secondary glaucoma, and their final subsidence, leaving a perfect field of vision, and an unusually high percentage of vision—20/10.

Did the implantation of an artificial ball play any part in producing, or inducing, the relapses? In view of the research work and the views brought out by this work, as shown in various papers read and published within the past few years, I think no connection can be found.

If the sympathetic inflammation had been a true iridocyclitis with exudates, I question whether one would have had the courage to allow the implantation to remain in. Even under these conditions, in the light of our changed theories, would the presence of the implantation make any difference in the course of the inflammation; provided of course, that the operation of enucleation had been done well, i. e. the nerve cut far back and the artificial ball properly anchored in Tenon's capsule?

In the case to be narrated, the question might be raised of its possible focal origin. This possibility I think can be eliminated. X-ray examinations of the teeth and sinuses were negative, as well as the examination of the tonsils.

CASE.—A. H., aged 17, I first saw on May 18, 1913, twenty-four hours after he had been struck in the right eye by a piece of steel broken from a hammer he was using. A local physician had tried the magnet in an effort to remove a possible foreign body. There was some doubt as to a foreign body being present.

Inspection showed a small central penetrating wound of the cornea, with some pericorneal injection. There was a slight hypopyon present; the lens was opaque, and there was only light perception. The vision of the left eye was 20/10.

The X-ray localized a foreign body 2 mm. by 2 mm., deep in the vitreous chamber.

Little encouragement was given in regard to saving any vision, or even as to saving the eyeball, but the family desired to have the foreign body removed and an effort made to save the ball. Haab's magnet was used to bring the particle forward in the vitreous, then the smaller hand magnet was used to work the metal into the anterior chamber. The chamber was then opened, emptying the hypopyon, and the steel was extracted thru the opening.

The eye remained reasonably quiet until May 31, 1913, when there was a recurrence of the hypopyon, the ball quite tender to touch, and more or less pain complained of.

The left eye showed normal tension, and a vision of 20/10. The patient was

urged to have the injured ball removed. This was done and a gold ball implanted in Tenon's capsule. There was no undue reaction following the operation; the healing was smooth and uneventful; the left eye remained quiet; there was no dread of light or change in the vision of 20/10.

He was discharged from the hospital on June 7, 1913. He returned later for inspection and adjustment of an artificial eye. At these visits, the vision remained 20/10 in the left eye and everything was perfectly quiet.

On February 17, 1914, he reported an alarming drop in vision. Four or five days before the visit, he first noticed a halo around artificial lights, then the drop in vision. Inspection showed no pericorneal injection; the pupil was dilated but active. There were many points of exudate on Descemet's membrane, but no exudate in the pupillary area, or in the vitreous. The tension was taken with the Schiötz instrument, and registered 30 mgm. The field of vision showed a full, normal field, but the blind spot area was very much enlarged. The accommodation showed a recession of the near point.

The patient entered the hospital, where pilocarpin sweats and inunctions of mercurial ointment were used systematically, and homatropin and eserine were used alternately, locally.

On March 9, 1914, the eye was perfectly quiet. The tension was 12 mm., and the vision 20/10. He was discharged from the hospital.

He again reported on April 29, 1915, stating that two days before there had been some pain in the eye, headache, a halo around the lights and some drop in vision. Inspection showed no pericorneal injection; the vision 20/15 and a recession of the near point. The pupil was active, and there were a few points of exudate on Descemet's membrane.

The deep media of the eye were clear. The tension again registered high—27 mgm. The patient again entered the hospital, where pilocarpin

sweats and inunctions were used; and locally a very weak solution of scopolamin alternately with eserine, and the use of subconjunctival injections of normal saline.

On May 14, 1915, the eye being quiet, the vision 20/10 and the tension registering 18 mm., the patient was discharged.

He was seen at various times afterwards, the eye found quiet and the tension normal, until September 17, 1917; when he reported, complaining of a drop in vision, some pain, a halo around lights and a recession of the near point. The vision was 20/15; the tension registered 35 mgm. He entered the hospital, where I instituted the same plan of treatment as was used before.

On September 26, 1917, the tension registered 18 mm., the exudate on Descemet's membrane had cleared; and the vision had returned to 20/10. The field of vision was normal; there was no enlargement of the normal blind spot, and the accommodation was normal. He was discharged from the hospital.

In this case, the lymphocyte count was made as described by Gradle in the Archives of Ophthalmology, page 567, Volume 39. The count was made before the injured eye was enucleated, and several times during each period of inflammation. The characteristic increase in the small lymphocytes, and the decrease in the polymorphonuclears, was not shown at any time.

I have frequently seen these findings in traumatic irido-cyclitis. In conditions of this kind, the count is a help and should be made. When found positive, it becomes a decided help in deciding the best plan to pursue in these often puzzling cases.

I have examined the patient once or twice since and the eye was found normal in every respect. A recent letter from him states that he is able to use his eye comfortably for near work, and his distant vision is clear.

PERIPHERAL COMMUNICATING VESSELS BETWEEN RETINA AND CHOROID. FOLD OF INNER LIMITING MEM- BRANE IN CHORIORETINITIS

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Four cases of this condition are here reported, with mention of other cases discovered in the literature. The curved line seen in one of these cases is explained as a fold in the limiting membrane, caused by disturbance of the equilibrium in the inner coats of the eye. Presented at the Section on Ophthalmology of the American Medical Association, April, 1920. Released for publication by the Journal of the A. M. A. Color plates of these cases will appear in a subsequent issue.

Patches of extensive pigmentation, and atrophy of choroid and retina resulting from chorioretinitis, are matters of such daily observation in the life of the ophthalmologist that when conditions to be noticed in connection with such patches are recorded only rarely, their scarcity must indeed be concluded therefrom. Still, this very familiarity with these chorioretinitic conditions might possibly lead to a neglect of closer study of the details and to overlooking of changes such as are reported below. In this way, in Case 2, the anomaly was detected only at the second examination. This is especially likely to occur in the cases in which the focus of chorioretinitis is more in the periphery and therefore less accessible to examination. It is for the purpose of directing attention to the very rare and extremely interesting conditions that the subjoined cases are reported.

CASES

CASE 1.—Robert S., aged 14 years, called at the Touro Infirmary Eye Clinic, March 21, 1912, stating that four days before he had been shot in the left eye with some BB shot, that the eye had been inflamed since, and that enucleation had been advised in another hospital. Vision, R. E., 5/5; L. E., doubtful light perception. Left eye: Marked chemosis of the conjunctiva of the eyeball; a small, yellowish linear wound of the cornea near the upper limbus appeared to be superficial only; a 2 mm. hypopyon was present; the iris was discolored and the pupil was filled with exudate; no fundus reflex could be seen. The patient was at once admitted to the infirmary; sodium

salicylat and mercury and potassium iodid were ordered internally, together with hot applications and atropin instillations to the eye. Marked improvement set in, and he could soon leave the hospital with normal vision of the injured eye. Examinations after discharge and since, the last during December, 1919, revealed: Right eye, normal. Left eye: A small linear opacity in the cornea near the upper limbus marks the site of the injury; a fine perforation of the iris and a linear opacity of the lens near the upper margin corresponding to the corneal opacity. The pupil is round and shows no posterior synechiae. The vitreous is clear. The disk is slightly irregular in outline, well defined, and is surrounded by a grayish pigment line at the temporal margin; a small white epipapillary membrane covers some of the lower trunks on the disk. About 3 d.d. vertically above the disk is seen a 1 by $\frac{1}{3}$ d.d. irregularly oblong or rhomboid area of dense black pigment accumulation, surrounded by an irregularly wide and more yellow halo. A branch of the upper temporal artery for the upper fundus coming from below runs thru the halo and touches the pigment area on the temporal side; slight veiling makes the details at this point not very sharp. A vein, almost as wide as the main upper temporal vein on the disk, draining the upper fundus and coming straight downward, approaches the pigmented area from above, advances on it for some distance, and suddenly disappears. No more of it is seen in the pigmented portion, but in the lower part of the yellow halo a fine, white and opaque line appears in its

continuation. In its course downward, this line is gradually getting thinner and less opaque white; a little over 1 d.d. from the halo it merges into a hairline-like vein which, getting thicker and uniting with another fine branch from a more temporal area enters the upper temporal vein about 1 d.d. above the disk (Fig. 1). Vision 5/5. In the field a large sector-like defect begin-

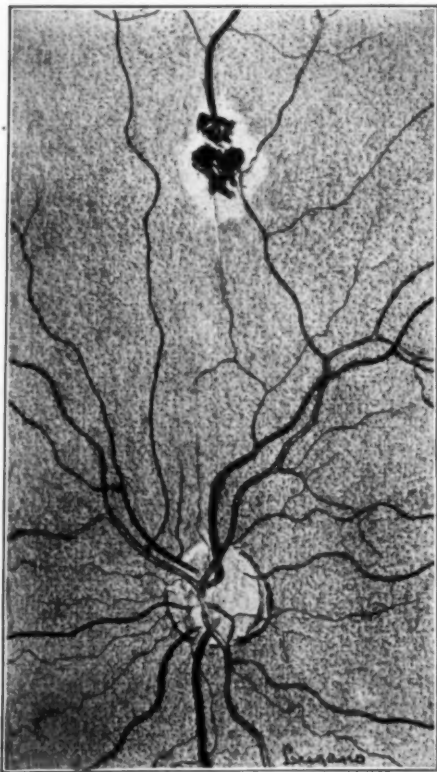


Fig. 1—(Case 1).—Peripheral communicating vessel between choroid and retina.

ning at the point corresponding to the pigment patch can be made out. Roentgen-ray examination revealed one small bullet in the brow and another one in the orbit, but whether in the eye or outside could not with certainty be established.

CASE 2.—Mrs. T. F., aged 46, called, July 27, 1915, because of headaches and difficulty in seeing at near, telling that she had never worn glasses, that she was being treated by a competent

internist for kidney trouble, and that he had ordered mixed treatment for her some time before. Her son, W. F., came under observation ten years ago for disseminated choroiditis of both eyes which was then considered of syphilitic origin. Retinoscopy under homatropin revealed: R. E. = L. E. + 0.50 \ominus + 0.50 c. ax. 180°. Vision 5/5 +. R. E.: On the disk begins a glassy transparent strand, extending upward and forward into the vitreous for about 5 d.d. About 4 d.d. from the disk along the upper temporal artery is seen an irregular and almost horizontal oval area about 2 by 4 d.d. consisting of a peripheral ringlike and a central oval portion. The peripheral portion is ringlike and contains numerous small and larger, black pigment patches, all lying behind the retinal vessels; between the patches the fundus is slightly more yellowish than around the focus. This peripheral portion encloses the central, irregularly oval and sharply outlined portion in which the fundus appears whitish pink, from atrophy of the choroid and retina; here several convolutions of choroidal vessels can be seen, but the finer details are not distinct. The upper temporal artery and one of its branches pass in front of both the ring and oval portions and are to all appearances unchanged. The upper temporal vein shows on the other hand, the following: From the disk upward, vein and artery are of about the same caliber and remain in close proximity to each other for a distance of about 2.5 d.d.; the vein, which until now ran above the artery, is now crossed by it and lies on the lower side of the artery; continuing in this relation for about $\frac{1}{3}$ d.d. after crossing the vein, makes a sharp rectangular bend downward and now continues in a diagonal direction down and to the temporal side past the macular region. No vein corresponding to the artery is seen on the nasal side of the focus; but on the temporal side, where the upper temporal artery crosses the ringlike pigment area, a large vein of the size of the upper venous trunk on the disk, the result of the union of two

smaller branches coming from the upper temporal periphery, is seen to lie below and parallel with the artery; this vein approaches and then crosses the upper part of the pigment ring and reaches up to the sharp edge of the central oval atrophic area, where nothing further can be seen of it. Not even a threadlike continuation connecting this point with the angular bend of the upper temporal vein after the crossing of the artery can be seen (Fig. 2). The left eye was normal.

CASE 3.—Miss C. A., aged 18 years, born and living in Guatemala, called,

of the macular region an area of intense black pigmentation is found surrounded by a narrow yellow halo, much lighter than the balance of the fundus. Below this one is a round, ringlike patch of black pigment about two-thirds the size of the disk, which is crossed by a branch of the lower temporal artery and surrounded by a narrow halo. Below the macula and to the temporal side of the ringlike pigment deposit are several small pigment accumulations, each surrounded by a narrower or wider yellow atrophic halo. The upper temporal and nasal

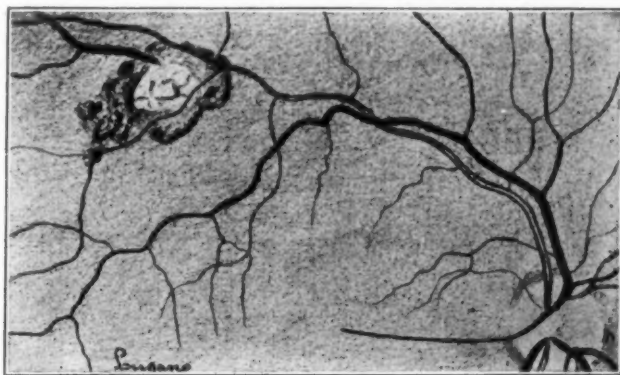


Fig. 2.—(Case 2).—Peripheral communicating vessel between choroid and retina.

Nov. 5, 1918, because she had been seeing black spots before both eyes for three months. Both eyes pained, the left one more. Her eye specialist, a well known and able man, had prescribed strychnin and mercury and iodids. Vision, R. E., 5/12; L. E., 3/60. Retinoscopy under homatropin: R. E. — 1.0 \odot + 1.50 c. ax. 90°; L. E. — 1.0 \odot + 0.75 c. ax. 90°. Right eye: The disk is somewhat irregularly outlined, well defined, not elevated, whitish on temporal half and pink in nasal portion. Adjoining the lower nasal margin of the disk the retina is slightly cloudy as if from a thin veil of connective tissue in the here slightly atrophic retina and choroid. In the macular area some disturbance in pigmentation and possibly some increase in pigmentation is seen; the fovea is indistinct. At the upper temporal side

vessels, the lower nasal vessels and the lower temporal artery are apparently normal. The lower temporal vein has apparently the normal thickness on the disk and for about 2 d.d. on its further course up to a point where it receives the first large branch from the lower periphery. From here on it is suddenly disproportionately thin and is wholly made up by the confluence of vessels draining the lower and temporal periphery. A rather large vein coming from the temporal periphery and arriving near the ringlike pigment accumulation makes a slight curve downward and then, almost vertically below the ringlike opacity after an angular bend of about 60 degrees, turns suddenly upward, runs straight up up to the ringlike patch approaching it from below, crosses the lower pigmented portion and abruptly ends

with a small hooklike curve in the yellow center of the ring. An almost imperceptible, thin vessel connects the angular bend of this vein with the lower temporal vein in its thin portion about $\frac{3}{4}$ d.d. to the temporal side of the point of entrance of the above mentioned vein from below. Beginning about 1 d.d. vertically below the center of the disk, a thin, whitish line runs almost parallel with the lower and nasal disk margins; turning to the

they are crossed by it; there is no appreciable parallax (Fig. 3).

Left eye: Vitreous dust and thready opacities make close study of details impossible. The disk is round, the upper and lower margins are not very well defined, not elevated; the disk is possibly paler than the right one; a trace of glassy membrane is found in front of the vessels just below the disk. A focus about two-thirds the size of the disk in the upper part of the macula

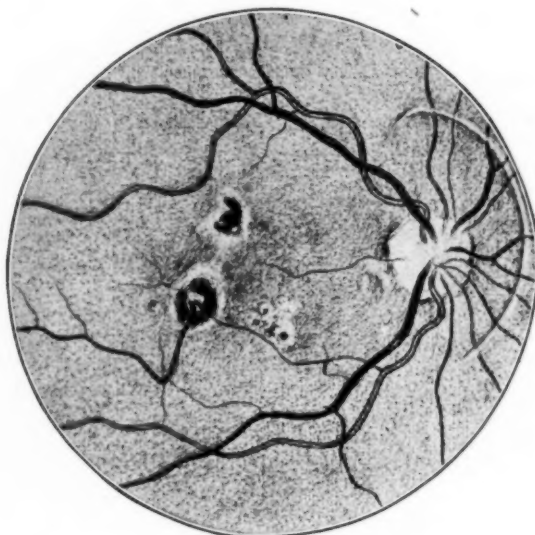


Fig. 3.—(Case 3).—Right eye: Peripheral communicating vessel between choroid and retina; fold of inner limiting membrane.

temple it is now a little farther away from the upper margin of the disk and making a spiral-like curve downward, it ends almost in a vertical line with the temporal margin of the disk. The line is thin, whitish, seems to have double contours, does not change position, and has a thin, reddish line of about the same thickness accompanying it. The position of the red line changes from one side of the white line to the other with the change of the light. At times the red line is found on the right side of one portion of the white one and on the left side of the balance of it. White line and its accompanying red one are always in front of the vessels; thru the white line the vessels can be seen whenever

extends upward to a horizontal, undulating and thin vein; it is irregularly round, greenish gray, cloudy, apparently somewhat elevated above the level of the retina, and is surrounded by a narrow yellow halo with small lumps of gray and blackish pigment. From the focus as a center numerous short and longer, radial, very fine, linear and brilliant reflexes extend in the lower half of the macula and also in a nasal direction toward the disk. To the temporal side of this focus are three small round yellow areas of depigmentation with traces of pigment accumulation. About 4 to 5 d.d. to the temporal side of the disk and in a horizontal line with the upper margin of the disk is a triangular, densely

black pigment accumulation surrounded by an irregularly wide yellow halo. Below this focus and almost in a horizontal line with the disk is a $\frac{3}{8}$ d.d. wide, irregularly round dense black pigment accumulation surrounded by an irregularly wide yellow halo. In the lower periphery are seen one or two large yellowish foci of depigmentation with some accumula-

periphery. The customary continuation to the temporal side is absent after the bend. A large wide vein characterized in the periphery by several angular bends (beyond area of the picture), and draining the temporal periphery of the fundus, arrives from the temporal side about 2 d.d. below the pigmented area, makes an angular bend of about 60 degrees, turns up-

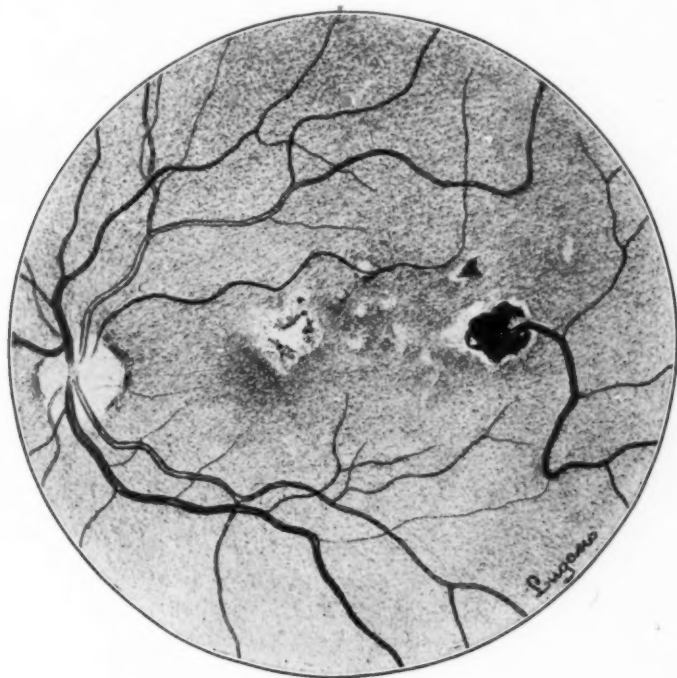


Fig. 4.—(Case 3).—Left eye: peripheral communicating vessel between choroid and retina.

tion of pigment and more extensive atrophy of choroid and retina. The upper vessels, the lower nasal vessels and the lower temporal artery are all normal. The lower temporal vein is normally wide on the disk and continues fairly wide until about vertically below the macular area, where it receives a branch, the result of the confluence of vessels from the macula and from the temporal side of it; for $\frac{1}{2}$ d.d. more the vein continues in this direction, then making an angular bend downward of about 90 degrees it is suddenly much thinner and is now only receiving branches from the lower

ward and then horizontally to the nasal side, approaches the pigment area from the temporal side, and crosses in front of it to the center, where it disappears without any further trace. A small yellow patch of atrophy is seen above the vessel, where it crosses the temporal portion of the pigmented area. A hairlike, irregularly thin vessel running from the sharp bend of this vein connects it with the lower temporal vein at the rectangular bend, where the vessel coming from the lower periphery becomes the lower temporal vein (Fig. 4).

During several weeks of observation

and treatment with mercury and potassium iodid, the left vitreous cleared considerably, the greenish focus in the upper part of the macula became less dense, less elevated, and more white; the radial reflexes in the macula disappeared and atrophy of choroid and retina began to show more clearly at the lower temporal margin (picture

common: In each instance we find an anomalous retinal vein which, draining a part of the periphery of the fundus, fails to continue in its course toward the disk and suddenly disappears in the midst of pigment accumulation as if thru a hole in the retina. These very unusual pathologic vessels, of which only a few examples are on

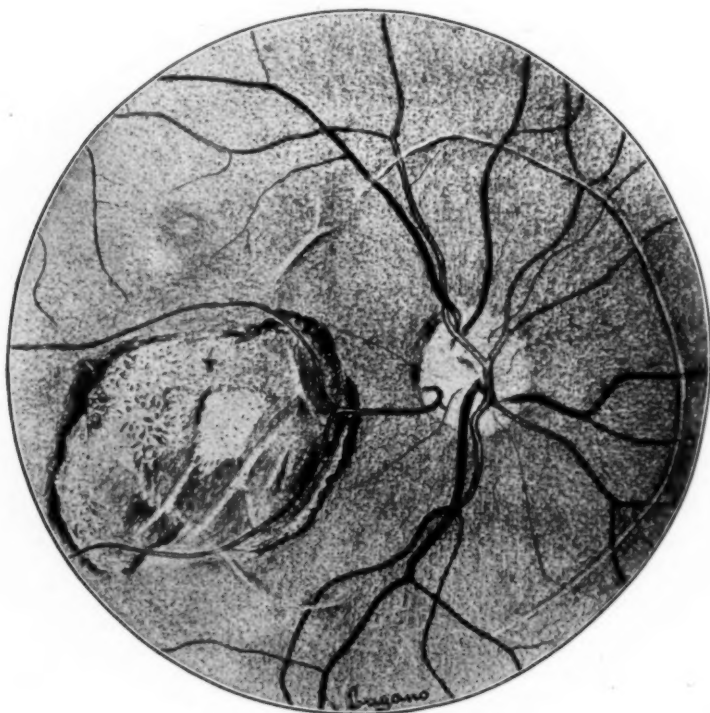


Fig. 5.—Fold of inner limiting membrane.

was made at this time). The patient finally returned home for further observation and treatment. The field of each eye was irregularly contracted, and the field of the left eye showed a scotoma extending from the fixation point downward from 5 to 10 degrees. Physical examination, including nose, throat and teeth was negative. The Wassermann test was found negative by one examiner, and positive by another. The luetin test was decidedly positive.

COMMENT

With the many differences natural to these cases, all show one thing in

record, are veins which connect the retinal with the choroidal circulation. Communication between the two systems of circulation has been demonstrated by Leber to exist in the normal eye at the disk. Because in these pathologic cases the communication is in the periphery these vessels have been classified as peripheral anastomosis between retinal and choroidal vessels. In his exhaustive monograph on the retina which appeared in 1915, Leber¹, collected from the whole literature five authors reporting such peripheral anastomoses, some venous, some arterial. Since then, Salus² has pub-

lished reports of two cases on two different occasions. A search of the literature has brought to light in addition three plates in Oeller's "Atlas of Rare Ophthalmoscopic Pictures," depicting three instances, in two patients, of active processes in the chorioretina in which the beginning of such peripheral chorioretinal vessels can be seen. These three plates have been overlooked by Leber and Salus. To all these cases must now be added the foregoing four instances discovered in three patients. This series shows, in Case 1, the interesting novelty that such adventitious vascular communication can develop after an injury. Case 3 of this series and Oeller's C. Tab. 3 and 4 are the only instances of a bilateral occurrence of this rare condition.

Leber divides the cases into two groups. In the first group the choroidal vessels enter into visible and wide communication with the normal vessels of the retina. The best example of this group is the case of Lawson⁴; the present series contains no such example. In his second group no such communication exists, and a certain district of the retina is not supplied by the retinal vessels but by vessels entering the retina through a chorioretinal focus. Cases 1 and 2 belong, without question, in the latter class, while Case 3 clearly forms the transition between Leber's two groups, since each eye shows a fine hairlike vessel which connects the normal retinal vein with the pathologic vein draining the blood thru the opening into the choroid. For the development of these anastomoses it must be assumed, according to Leber, that after occlusion of the retinal vessels by the disease, vessels from the choroid grow into the retina in places where the tissues have been destroyed by bleeding or inflammation, and we must now add, or by injury. Thus in Case 2 the mechanism is easily understood if we assume that the focus of chorioiditis produced first an obstruction of the vein at the focus and that it soon after gave occasion to ingrowth of a choroidal vein which, communicating

with the thrombosed retinal vein, led to the reestablishing of almost the entire venous circulation in the retina. It is manifest that in this case not even a fine venous thread need mark the course of the original vessel between the focus and the bend in the superior temporal vein. A similar explanation holds for Case 1, and the fine vein in the original course of the vessel below the seat of injury is probably to be explained in such manner that this fine vessel, the remnant of the old vein, actually does not even partially drain the area above the focus, but that the blood it carries is solely derived from fine microscopic and therefore ophthalmoscopically invisible vessels from below the focus and its neighborhood. The peculiar emerging of the fine hairlike vein from the opaque white line would certainly bear out such an assumption.

While Leber's theory certainly holds good for the way the choroidal blood vessels begin to communicate with the retinal vessels in these two cases, it gives no explanation why such vessels will occasionally, in part, or wholly remain in communication with the retinal vessels as in our Case 3 or in the case of Lawson belonging in Group 1. Nor does this theory explain why the blood current should be diverted in the direction opposite to its original course, as happened in Case 3, in each one of the veins from the point where it disappears in the center of the pigmented area up to the point of the angular bend where the fine red line begins.

These difficulties can be explained, tho, if we assume that at the beginning of the chorioretinitis a small particle of the thrombus from the small vessel overlying the focus broke away and, being carried by the blood stream in a central direction toward the disk, was caught and became lodged at that point of the lower temporal vein, which later stood out as the angular bend. Because of anatomic peculiarities, such as narrowness, the size of the angle under which the vein united with the trunk, etc., this point may have been the cause that the small ob-

struction could lodge here and form the beginning of an almost total occlusion of the vein. Further developments, such as organization, canalization, etc., would finally determine whether the blood flow would stop entirely or become more or less entirely restored. While the occlusion at this point was at its height, proliferation of vessels from the choroid in the region of the chorioretinal focus began, and an anastomosis was soon established between the choroidal vessels and the small thrombosed retinal vein. The moment this was accomplished, all the blood dammed up in the peripheral part of the vein, because of the obstruction at the angular bend, began to turn in the the direction of least pressure, utilizing the newly opened path to leave the interior of the eye. In the whole vein the blood used normal paths and ran in the normal direction. Only in that short vessel which begins in the focus and ends at the angular bend of the vein as it arrives from the periphery was the original direction of current reversed by the pushing mass behind it, and the narrow path had to be widened to accommodate all the accumulated blood from this part of the periphery.

While the formation of peripheral anastomoses as here described is a most desirable outcome after chorioretinitis or injury, since it restores the circulation in the affected part of the retina, we have, unfortunately, no hand in determining such a happy result. Of the two factors on which such an outcome primarily depends, the seat of focus or injury and its proximity to the retinal vein and suitable choroidal vessel is manifestly determined before our aid is called into play. But even the other factor—that of establishing the communication if conditions are favorable—is at present outside of the sphere to be influenced by our actions.

FOLD OF MEMBRANE.

The white line running more or less concentrically with the nasal margin of the right disk in Case 3, and the red one accompanying it, though not intended as the main subject of this pa-

per, demand more detailed discussion. No picture reproducing a similar condition could be found in all the available collections of fundus pictures, nor could a description be located in the literature which would correspond to this observation, excepting possibly the changes found by Hudson⁵ after a foreign body injury. This question was especially studied some seven years ago when Mr. W., aged 43, whose right eye had always been bad, presented himself at the office for examination because of difficulty at near vision. As the cause of his difficulties, hypermetropic astigmatism and beginning presbyopia were found, while the cause of the poor vision of the right eye was found in a large area of atrophy of the choroid and retina in the macular region and beyond it, partly laying the sclera bare and containing patches of pigmentation. A similar whitish, more or less circular, incomplete line surrounded, as in Case 3, the disk almost concentrically. This circle was interrupted only below and where it crossed the focus in the macular region. In the upper temporal portion of the ring, a small branch was given off by it. As in Case 3, the whitish line continually kept its position under all conditions of light, allowed the vessels crossed by it to shine thru, and was accompanied by the thin red line which continually changed position with the varying conditions of light (Fig. 5). The patient has remained under observation until the present day, and the position of the line and its accompanying red one have remained unaltered. Close observation at the time of the painting of the picture, and later on with the Gullstrand ophthalmoscope, impressed one with the fact that the line was absolutely fixed in position and, therefore, no reflex. The impression was gradually gained that the white line was entirely the expression of a fold in the inner limiting membrane brought about in some manner by traction or other disturbance of equilibrium in the inner coats of the eye in consequence of the scar in the choroid and retina. The red line, because of its changing relation to the white one, came to be

looked on as purely a shadow at the foot of the white line, which shadow has assumed that peculiar deep red color because of the fundus coloring.

This impression as to the nature of the white and red line has been greatly strengthened during the observation of Case 3.⁷

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A CASE OF OCULAR PEMPHIGUS

WM. CAMPBELL POSEY, M.D., F.A.C.S.

PHILADELPHIA.

This paper includes with the report of a case a review of the general clinical features of pemphigus and the allied condition known as Duhring's disease. Read before the Section on Ophthalmology, College of Physicians of Philadelphia, Feb. 19, 1920. (See p. 523.)

In October last a colored female, 25 years of age, married, was referred to me in my service at the Howard Hospital, on account of an acute exacerbation of an inflammation of the eyes; which had initiated itself as part of a more or less chronic skin trouble, some three months previously. According to the patient's statement, the latter affection appeared in August of 1918, and took the form of an eruption of small blisters over the chest. Her health was poor at the time; indeed she stated that she had never been robust, and had repeated attacks of pleurisy since she was 15 years of age. For relief of her skin affection she sought the Woman's Hospital, where she came under the care of Dr. Rose Hirschler, whose notes, thanks to Dr. Hirschler's courtesy, are as follows:

"I recall Mrs. P. D. distinctly as an interesting case, however not of pemphigus of the skin but of an allied affection, dermatitis herpetiformis or Duhring's disease. I recollect her very well as having recurrent attacks of the vesicular eruption, quite typical in type, but growing more severe as time passed, particularly as it affected her

general physical condition. She had never a typical pemphigoid eruption, as dermatologists call pemphigus. She had, however, vesicles on the mucous membranes of the mouth, nose, and even as I recall it, small ones on the inside of her lower eye lids. So I suppose that possibly you are looking at an exaggerated attack of not pemphigus, but its cousin, Duhring's disease.

During each attack the rash cleared under the use of some form of arsenic, Fowler's drops having been the most efficient. Our clinic, as all others during the war times, was too poor to supply hypodermics of cacodylat of soda, so that was not used. I believe that at my exodus from the clinic last year, Mrs. D. was in the throes of her fifth or sixth attack, which was a generalized, typical severe attack of the disease. She has always been, as I knew her, a thin, undernourished female, about in her middle twenties and a rather intelligent mulatto. She had no family history of any similar or allied skin affection and seems to be simply a law unto herself in that she is the only one so afflicted in the family."

After passing from Dr. Hirschler's

observation, at the end of a year the patient consulted other practitioners in private, but with indifferent success, as fresh crops of blisters manifested themselves, their appearance being preceded by severe localized pains over the surface of the chest and face, like bee stings. The eyes also became affected, smarting and watering and sensitive to light. Another change of medical advisers seemed desirable and she became a patient in the Dermatological and Ophthalmological Depts. of the Hahnemann Hospital. Apparently there was nothing in the ocular condition at that time to attract particular attention, the notes of the eye clinic which she visited a few times reading "phlyctenular conjunctivitis; treatment, boric acid and argyrol." I am indebted to Dr. Ralph Bernstein for a fuller account of the condition of her skin.

"Mrs. P. D., colored, married, age 25 years came to Dermatological Dispensary August 11, 1919, with a history of an eruption involving the arms, face, body, neck, mouth and eyes, which she had had for several years and claimed to have been treated at several other hospital dispensaries thruout the city without result. The eruption itched intensely all the time, preventing to a great extent the patient's sleep. There was decided lacrimation and photophobia. The condition of the mouth prevented proper mastication of solid food, nevertheless the patient seemed to be in fair condition generally.

The eruption consisted of groups of papules and vesicles with secondary small ulcerations, crusts and pigmented scars, following the scratching, from which the patient seemed unable to abstain. The lesions were mounted on an erythematous base.

Altho the patient denied all history of syphilis and gave a history of several negative Wassermanns, she was placed under antisyphilitic treatment for a short period without benefit. The diagnosis of dermatitis herpetiformis was made and the patient treated with an emulsion of olive oil containing camphor and chloral and given croton

tig, 12x. In three days she returned and altho the emulsion relieved to a certain extent the itching the number of lesions still increased and the lacrimation and photophobia were more marked. Croton tig. 30x was prescribed, the olive oil emulsion continued and the patient referred to the Eye Dispensary. After three days the patient again returned with the number of lesions still increasing and the eye symptoms more marked. Croton tig 200x was prescribed. Since November 10, she returned to the Dispensary at irregular intervals showing at times some improvement and at others none. We have no record of the treatment given by the eye department.

At her last visit the eruption involving the mucous membrane of the mouth and lips was improved, the eruption on the skin was unimproved and the eyes unimproved."

When the patient first came to the Howard Hospital, Oct. 15, 1919, there was some photophobia with a rather marked tendency to blepharospasm. Examination showed a series of a dozen or more small bullae, dotted here and there upon the lids and over the skin of the face. The corneas of both eyes were clear, but the conjunctiva was red and injected, especially below, and involved in a series of irregularly rounded grey areas. The ciliary margins of both lids, but especially of the lower, were incurved and the cilia were in apposition with the globe. There was considerable lacrimation but no other discharge. Despite epilation, the administration of atropin and soothing collyria and general treatment, the symptoms rapidly progressed; the lower cul-de-sacs growing markedly shallower, in consequence of an agglutination of the inflamed bullae and palpebral portions of the conjunctiva. Both corneas became hazy, infiltrated and superficially vascular, the invasion starting at the periphery, and rapidly extending towards the centre of the membrane. Vision, which equalled 5/9 in the right eye and 5/12 in the left eye at the first examination, sank rapidly; so that at

the end of six weeks, it equalled counting fingers merely.

A searching examination of her general condition, which was made while she was in the hospital, and a few weeks later by Dr. G. M. Piersol, who saw the case in consultation, failed to reveal any gross abnormality, except a general asthenia and evidences of an old consolidated area at the apex of one of the lungs. A Wassermann was negative. As the patient became homesick in the hospital wards, she has been treated as an ambulant, her general condition of inanition and *malaise* remaining apparently stationary. The conjunctivas are now rapidly shrinking, shallowing the cul-de-sacs more and more; tho the corneal haze seems slightly regressive.

Stelwagon defined pemphigus as "an acute or chronic bullous disease, characterized by the formation of scanty or numerous irregularly scattered variously sized, rounded or oval blebs, arising from apparently normal or moderately reddened skin, and which may or may not be accompanied by mild or severe constitutional disturbance."

Pemphigus of the eye is a rare disease. Although observed more frequently in Europe, it is not seen more than once in 500 cases of skin disease in this country and in England. Hebra did not meet with one instance of ocular involvement in 200 cases of pemphigus of the body, which had been under his care. That the disease is a rare one in eye clinics the following figures show. Thus Santos Fernandez, of Cuba, saw but three cases among 50,000 patients; in Germany, Pergens, two cases among 22,000, Franke 5 among 45,000 and Homer 3 in 70,000. I estimate that during the past 28 years, I have observed approximately 75,000 cases, and the reported case is the first one which has come under my personal care.

Quoting Chance's excellent resumé, in the American Encyclopedia of Ophthalmology, Vol. XII—"There seems to be no constant relation between the duration of the skin affection and the development of the ocular lesions, yet,

in some cases only a few weeks have been known to elapse between the time of the first appearance of the bullae on the skin and the implication of the conjunctiva. In other cases it may be presumed that the association has been closer still, inasmuch as the lesions of the skin or mucous membranes may have been absent for a time or they may have been overlooked, and in this regard it can not be too strongly emphasized that without coincident pemphigus of the integument a positive diagnosis of ocular pemphigus cannot be made. The affection may have begun as a general pemphigus but the conjunctiva may not have been attacked for some years later; so too, it has been known to arise primarily on the conjunctiva, and later involve the skin. No instances have been reported of conjunctival lesions in acute pemphigus. The symptoms of the disease of the conjunctiva, just as in the dermal manifestations depend for their severity upon the extent or depth to which the membranes are invaded."

Females are more predisposed to the disease and it is more frequent in the young than in adults. Stelwagon says it is probable that the several so called varieties of pemphigus are due to different causes, or perhaps the ingrafting of an accidental factor upon the same disease process. There seems to be some association of the disease with animals or their product as a frequent source. Stelwagon thought that in many such cases the underlying factor is a streptococcic infection. He believed also that a derangement of the nervous system, either by direct action or merely contributory to a successful parasitic invasion or infection, is of etiologic importance. He was furthermore of the opinion that the cutaneous manifestations are but a part of a systemic process or infection, as pathologic studies show organic changes in other organs and structures. Altho pemphigus occurs in syphilitics, syphilis is not an etiologic factor in all cases.

In Parsons' Pathology of the Eye will be found the following: "One of the earliest cases of pemphigus of the conjunctiva was published by White

Cooper (1858); before that date—and since also—it has been confused with xerosis. It was described as *syndesmitis degenerativa* by Stellwag (1870), and as *essential shrinking of the conjunctiva* by Kries (1878), of von Graefe's clinic. Von Graefe (1879) propounded the identity of pemphigus and essential shrinking, whilst Becker (1879) admitted only the identity of the latter with syndesmitis. v. Graefe's view is now generally admitted (Fuchs and others)."

As may be gathered from the foregoing, the prognosis for sight is extremely bad, total or almost total loss of vision intervening more or less rapidly. Not unfortunately, in view of the visual condition and general asthenia, death frequently intervenes shortly after the mucous membranes of the eyes and mouth become involved.

Local treatment is of course merely palliative. In cases where the conjunctival affection is not so actively progressive, transplantation of skin or mucous membrane, into the cul-de-sacs, may be essayed, with some hope of partial relief. Generally, arsenic, quinin and strychnia, and particularly the former, are of most service.

It will be noted that in reporting and considering the case as one of ocular pemphigus, I have ignored the diagnosis of both Drs. Hirschler and Bernstein, who differentiated the case as Duhring's disease. This variety of

skin affection being, however, so closely related to pemphigus, the points of difference between the two being largely academic, it seems best to record the case under the more familiar and comprehensive disease. It may not be without interest, however, to state in this connection that Stelwagon defines Duhring's disease as follows: "Duhring's disease or dermatitis herpetiformis is a rare inflammatory disease, with or without slight or grave systemic disturbance, characterized by an eruption of an erythematous, papular, vesicular, pustular, bullous or mixed type, with a decided tendency toward grouping, accompanied usually by intense itching and burning sensations, with more or less consequent pigmentation, and pursuing a persistent, chronic course with exacerbations."

He says that pemphigus differs from the bullous type of dermatitis herpetiformis in that the lesions of the former are usually larger and show no special tendency to occur in groups or to assume irregular angular or multiform shapes, etc. The constitutional symptoms of Duhring's disease are, as a rule, not nearly so marked as in pemphigus. A fatal ending is possible in the grave cases, tho the disease usually persists for years without compromising life; and in many patients the general health, considering the violence of the of the eruptive phenomena, remains comparatively undisturbed.

NOTES, CASES AND INSTRUMENTS

UNILATERAL BLINDNESS (WAR TRAUMATISM) FOLLOWED LATER BY BLINDNESS IN FELLOW EYE

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PHILADELPHIA, PENN.

Read before the Section on Ophthalmology, College of Physicians, Philadelphia, February 19, 1920. For discussion, see p. 522.

While fighting at Soissons, France, in July, 1918, James D., age 22, received a shrapnel wound about the junction of the parietal and temporal bones on the right side. He was taken to a hospital, the right eye operated on, possibly a conjunctival flap, and both eyes bandaged for several days. Upon removing the bandage the right eye was found to be blind, and has remained blind without any return of even light perception. The left eye was uninjured and its vision unimpaired. He has been interned in a hospital at Coblenz, a hospital at Bordeaux and the hospitals of three camps in the United States. He was admitted to the Jefferson Hospital, January, 1920. From April 19th, 1919, he has been employed as an automobile truck driver. He stated since his return to the United States, that he has suffered from headache and pain in the eyes.

The day before admission he was in his usual health, and on the following morning, when he awoke he found to his dismay, he was completely blind in the left eye. The only ocular lesions discoverable were in the right eye, and consisted of an irregularity or thickening of the corneal limbus down and out without real opacity or material change in the corneal structure. The media are clear. There is one posterior synechia. In the fundus below the disc are two parallel, almost straight lines of rupture, not crescentic with either the fovea or the optic disc, and about three disc diameters in length. No hemorrhages or traces of previous extravasations, or pigment changes unconnected with a cicatricial

line of rupture; no yellowish dots of exudation, and no retinal folds or wrinkles in the foveal region are present. The vascularity of the optic disc and retina is good, and there is no indication of incipient atrophy of either tissue.

It is plainly evident therefore, that the fundus picture of the right eye afforded no explanation of the total blindness. The left eye was normal in every respect. Both pupils respond to light and consensually. The excursions of the iris were not extensive, but contraction upon exposure was undoubtedly present, indicating that if a cerebral lesion existed, its location must be posterior to the basic centers.

With the exception of blindness, the patient seemed to be in good health. True, he had exaggerated knee jerks, a trifle more pronounced on the left side, but neither Dr. Dercum or Dr. Gilpin had been able to find any disease of the nervous system. The throat, nose, sinuses and teeth are healthy, and the organs of the abdomen and chest performed their functions properly. Urinalysis is negative. Dr. Manges by means of the X-ray, eliminated fracture of the skull, changes in the bony structure and cerebral growth. The only important guideposts toward arriving at a diagnosis were the complete blindness of the right eye, immediately following a wound in the right temple and persistent for 18 months, sudden and total loss of vision of the left eye 16 months after injury, and the negative results of an exhaustive physical examination.

Three possibilities suggest themselves: Are we dealing with a case of

organic disease of the brain, a case of hysteria or a case of malingering? The last hypothesis cannot be supported by any of our observations, and may be dismissed in a few words. Binocular feigned blindness is extremely rare. It may be assumed because of desire for sympathy, for relief for some pending duty, for compensation, or may be regarded as an eccentricity of a disordered brain. The patient does not suggest such a condition with the exception of one point. The government allowed a pension of \$30.00 per month until recently, when the amount was cut to \$3.00. Just what relation the reduction bears to the time when he claims he became blind in the left eye is unknown. His manner of looking, his efforts to see, his collision with objects in the room, and his general behavior are positive protests against the diagnosis of malingering.

While I am inclined to attribute the symptoms to organic central disease, my reasons are not convincing, even to myself. It must be remembered, that simultaneously with the shrapnel wound in the forehead, the right eye suffered a double injury, one to the corneal limbus and one to the fundus. The exact nature of the former may only be surmised but probably consisted of a tear, or cut which was operated on with satisfactory results. The double rupture of the choroid is proof of a severe concussion. Neither of the injuries explains the complete and permanent blindness of that eye; and since the ophthalmoscope shows undisturbed circulation in the nerve head and retina, atrophy of the nerve, a lesion that might have been expected, may be positively excluded. The sudden and complete blindness of the left eye, many months later, is unexplainable on the basis of ocular lesions.

The recovery of light perception first in the temporal field, then in the entire peripheral field and finally a partial recovery in the central field with retention of pupillary response to light, thruout the period of observation,

points to a lesion of the higher centers. His attack of mental depression, lasting two or three days during which his indifference to life leading to thoughts, if not attempts of suicide, indicate also derangement of the cortical centre. The character and extent of this lesion, if lesion there be, are conjectural. Microscopically small changes could not explain the blindness. Gross alteration in the brain caused by hemorrhages, embolism or softening would certainly be indicated by other and more symptoms than those suffered by this patient.

This case bears no resemblance to the few cases of transient blindness from concussion reported by Lemier (*Ann. d'Oculist*, v. 155, p. 108) and Bussy (*ibid* Page 423) abstracted in the *Oph. Y. B.* (*Amer. J. Oph.*, Oct. 1919). The blindness was attributed, by the former, to vasomotor disturbance of the occipital lobes, and by the latter, to vasomotor disturbance, dependent upon a retinal anemia and shock to the sympathetic nerve system. In de Schweinitz's interesting paper published in the *AMERICAN JOURNAL OF OPHTHALMOLOGY*, May, 1919, Lagrange (*Atlas d' Opht. de Guerre*) is quoted as having occasionally noted defective vision, central scotoma, and no evidence of ophthalmoscopic changes in the macula. De Schweinitz remarks: "This I have not observed, but I have seen a fundus free from pathologic signs, except a delicate stippling of the macula and a minute Y-shaped choroidal rupture." In favor of the diagnosis of hysteria may be stated, blindness without ophthalmoscopic changes, and without intermission, pupillary reflexes, exaggerated knee jerks, the absence of physical cause as shown by the examination of all the functions, and the hope of more substantial recognition by the government of his sacrifices.

Vision today, 2, 18, 20, R. 1. p., L. 6/30. Field partly limited except to temporal side. Color perception only at fixation point.

EMBOLISM OF CENTRAL ARTERY OF RETINA. RESTORATION BY FORCIBLE MASSAGE.

HARRY VANDERBILT WÜRDEMAN, M.D.,
SEATTLE, WASH.

Sudden blindness due to true embolism of the retinal artery is an extremely rare occurrence, whereas thrombosis is relatively more common, tho indeed the latter is seldom seen. The former is due to a blood clot, fibrin, or other foreign body being carried from the main arterial stream to the terminal artery of the eye and is usually

who had been treated by this method which has been generally adopted. Doubtless there are a number of cases not published and a few more on record. I have seen several more, but as they are not particularly pertinent to this article, report only the one which follows:

N. E. J., aged 70, consulted me about 3:00 P. M., Sept. 2, 1919, stating that he had become suddenly blind in right eye since morning. He had several spells of clouding before the eye during three months, but this time the clouding did not disappear. He is under treatment with Dr. Heussy for arteriosclerosis, enlargement of the

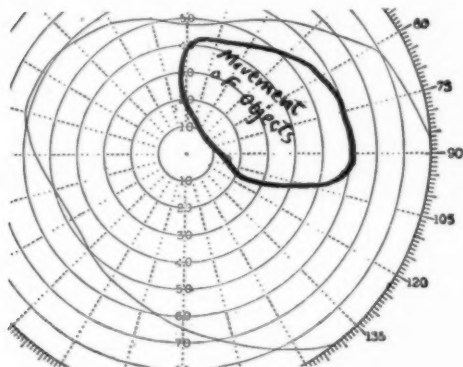


Fig. 1.—Field of vision when patient was first seen. Movement of large objects perceived in part of upper temporal field.

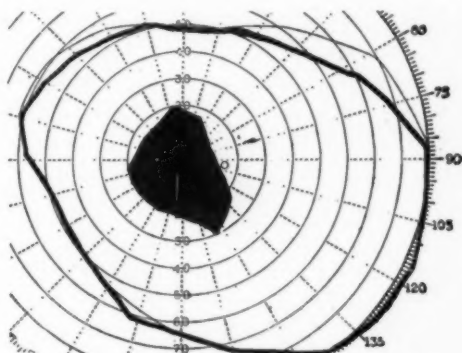


Fig. 2.—Field of vision on second day. Outer limits for form restored, large central scotoma.

associated with cardiac disease. The latter is due to inflammatory degeneration of the walls of the artery associated with renal and arterial degeneration. Neither of these conditions is amenable to treatment after they have existed for some days, but if seen early, the corking of the vessel may be sufficiently removed to permit of a partial or complete flow of the blood stream, and in either condition the nourishment of the retina may be restored and its vitality insured with return of the function of sight.

In 1899 it was found by Casey Wood,¹ that the clot could be dislodged in some cases by deep digital massage and the sight thereby returned. This was substantiated by me in the report of two cases,² and later by the report of ten from the literature with two more of my own,³ making fifteen to that date,

heart and renal disease, none of which are marked.

Upon examination he could see movement of large objects to right with right eye; left eye was normal in every respect. Ophthalmoscopic examination showed the disc blanched and the arteries and veins nearly empty of blood. Sufficient time not having elapsed to produce edema of the retina, the typical cherry red spot in the macula was not seen. Pupil of right eye showed no reaction to light but contracted to accommodation. B. P. 210 systolic; 110 diastolic. Physical examination of the heart showed it to be somewhat enlarged with snappy sound of aortic valves.

Immediate deep digital massage followed by suction massage with the pneumatic pump used during a period of one-half hour; frequent observa-

tions being made with the ophthalmoscope and at the end of that time it was found that the disc reddened, both arteries and veins filled and the sight came back to the perception of objects in the whole field. On the next day the visual field was full with the exception of an absolute central scotoma of nearly twenty degrees; fourteen days later the scotoma had

The patient remained under dietetic treatment and took small doses of iodid of soda; four massage treatments were given and about twelve of high frequency electricity, the latter incidental to the various examinations, rather than in the hope of improvement therefrom.

This case is reported for the reason that I had never before seen one so

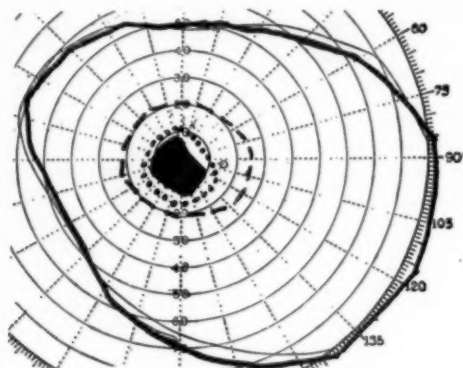


Fig. 3—Obstruction of central retinal artery. Field of vision on fourteenth day. Field for red broken line; green dotted line. Central scotoma smaller.

shrunk to ten degrees with restoration of colors and visual acuity of 6/60 when the patient looked slightly to one side and the fundus appeared normal with normal pupillary reaction.

At the last observation two months later the visual acuity remained the same, the fundus appeared normal and the central scotoma was slightly reduced.

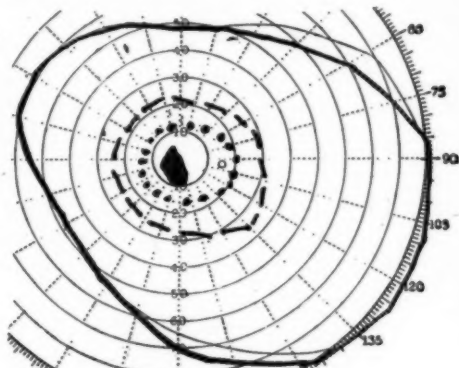


Fig. 4—Field of vision at end of two months. Small central scotoma. Fields for red and green slightly larger.

soon after the sudden blindness, as well as to show the course under this form of treatment.

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SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

March 3, 1920.

MR. W. T. HOLMES SPICER, President.

Iridotomy in Immature Cataract.

Mr. J. H. Parsons showed a case in which he performed iridotomy. The patient came with immature cataract, in which the opacity was chiefly in the posterior cortex. He did the ordinary extraction, with a peripheral button-hole, a simple extraction first, then made a tiny hole in the periphery of the iris afterwards. The patient did well, going out with the eye quiet in ten days. A week later, however, she returned with a hypopyon and a flaring iritis, which he regarded as due to endogenous infection.

He took her in, and treated her in the usual way, but, in spite of atropin and hot bathing, the pupil became very small, and eventually blocked. He described by means of a drawing the method in which he did the iridotomy, namely, puncturing the iris and passing a Tyrrell's hook in behind the iris, with the idea of coming out of the tiny coloboma at the top. There was a breach of iris, and she was left with an artificial pupil below, which looked like an ordinary pupil. She was left with slight vitreous opacities, but, with correction, her vision was 6/18.

Several members discussed the case.

Mr. Parsons also showed a case of extraction of a dislocated lens.

Vestibular Nystagmus.

MR. LESLIE PATON exhibited a patient who came to hospital with certain visual defects but whom he was showing because of an extremely readily excited vestibular nystagmus: it was brought on by the mere pressing of cotton wool into the ear.

Blue Dotted Cataract.

Mr. Paton also showed a case of cataract. He had previously had a

similar case. The vision in these cases was usually very little interfered with, and the ophthalmoscope revealed, in this patient, very little opacity. With correction, the vision was 6/12 in one eye, 6/9 in the other. All, including Lord Rayleigh, seemed to agree that the blue color was not due to the presence of pigment, but to a refractive peculiarity.

DISCUSSION.—Mr. Charles Wray said there was a family history of the condition in several of the cases.

Mr. Bishop Harman referred to two cases in which there was an association of this peculiarity with night blindness. Mr. Treacher Collins and Mr. Ernest Clarke also referred to similar cases.

Other cases included one by Mr. Leslie Paton, mass of connective tissue covering the disc, Mr. M. S. Mayou, gummata of eyelid.

Aniridia and Glaucoma.

MR. W. H. McMULLEN showed a case of congenital aniridia, which was associated with some signs of glaucoma. From the momentary view of the discs which was possible, they seemed to be definitely cupped, and palpation seemed to indicate a raised intraocular tension. He raised the question whether trephining should be done, or some other form of operation with the object of allaying irritation. Or should one wait and note what happened?

DISCUSSION.—Mr. Bishop Harman suggested it might be well to try cyclo-dialysis for the separation of the ciliary body: the results of this in Vienna had been declared to be satisfactory, and it was said to produce the least interference in an eye in regard to which one was doubtful whether any interference should be undertaken.

Mr. Frank Juler suggested that a trephine operation might be dangerous in this case, as there must be very little iris tissue left, and in making a trephine hole into the anterior chamber

one was apt to wound the lens. He spoke with knowledge of a case in which he saw disastrous results.

Mr. M. S. Mayou said he had trephined a case of aniridia, and it was satisfactory.

Cyst of Lacrimal Gland.

Mr. McMULLEN also showed a case of cyst in the outer part of the orbital margin of the left eye. He believed it to be a cyst of the orbital portion of the lacrimal gland: it was adherent to the roof of the orbit, and only loosely attached to the tarsus. It did not present behind the lid, as did the ordinary lacrimal cyst.

DISCUSSION.—Mr. Treacher Collins said a feature which helped to confirm the diagnosis of cyst of the lacrimal gland was, that when the patient went out into the cold wind the cyst became bigger.

Sir William Lister spoke of a case in his experience in which a cyst of the lacrimal gland went behind the globe. The boy had proptosis of the left eye, which got worse, and the eye was pushed downwards and inwards. He did Krönlein's operation, and after cutting thru the periosteum and separating the orbital fat, he encountered a very black tumor, and in proceeding to separate this, it suddenly burst in his face, and the contents practically disappeared. He feared infection at the time, as the lad had somewhat severe acne of the face. But it healed up by first intention, and the vision—which had gone down to 6/24, with contraction of the field was 6/6.

Mr. Charles Wray suggested that the cyst should first be punctured, as that would greatly facilitate its dissection.

Mr. Jeremy said he had removed a cyst from the inner side of the upper lid, and it was found to be lined with squamous epithelium and contained mucus. He thought it was a trans-plantation cyst, and suggested that was the nature of Mr. McMullens.

Mr. Leslie Paton discouraged preliminary puncture of the cyst as it might be a cyst of Krause's gland.

A New Test of Color Vision.

Dr. Edridge-Green exhibited, by

means of epidiascope, a series of cards designed to test various forms of color vision defect. The basic idea was a large number of fancy forms which could not be described or memorized by the person submitting to the test, and these were, in succeeding cards, colored in various ways, and large designs wrought in one color with a varying background. He had not known this test to fail in any single case.

DISCUSSION.—Mr. J. H. Parsons pointed out the great difficulty of ensuring that every test-set bore identical shades of color: that had been found to be a real drawback in all the published tests. Not only did different editions of the prints vary, but copies of the same edition did so, no doubt largely due to the fact that anilin dyes faded, and the progressive penetration of the color into the lithographic stone.

Cobalt Glass in Detecting Astigmatism.

Mr. Leslie Paton read a note on the use of cobalt glass in testing for errors of refraction, especially small errors in astigmatism, his object being to refresh memories of the use of this glass for the purpose. He gave a demonstration.

In the discussion it was stated that there was likely to be unnecessary trouble in testing if this were employed, as patients would worry unnecessarily over quite trivial errors and bother the ophthalmologist accordingly.

Treatment of Prolapsed Iris Following Perforating Wounds.

Mr. Charles Goulden read a paper entitled "The Treatment of Prolapse of the Iris Following Accidental Perforating Wounds: with a Note on the Removal of Nonmagnetic Foreign Bodies from the Anterior Chamber." He said attempts at reposition of the prolapsed iris should be avoided, owing to the risk of infection of the anterior chamber of the eye, and because such replaced iris would again relapse. The patient should not be left with the iris incarcerated, otherwise there would either be delayed healing of the wound, or a weak scar which might bulge un-

der intraocular pressure, or defective vision due to displacement of the pupil, and irregular refraction of the cornea, iridocyclitis, or sympathetic iridocyclitis. If several days had elapsed since the wound was received, the case became much more difficult to deal with. Still, cases could be operated upon and the wound freed from uvea as late as ten days after the accident.

The author proceeded to detail the measures he employed in each type of case, which a condensed report without diagrams could not do justice to.

The paper was very appreciatively discussed by several members.

H. DICKINSON.

ST. LOUIS OPHTHALMIC CONFERENCE.

Meeting February 13, 1920.

DR. H. D. LAMB, presiding.

Heterophoria.

DR. WM. F. HARDY stated: Orthophoria has been defined as the condition of perfect ocular muscle balance and heterophoria as any deviation from that ideal state. While the majority of ophthalmologists systematically test the balance of the ocular muscles, the practice is not as general as it should be. The oculist who prescribes the first glasses is always at some disadvantage. He who prescribes later for the same patient has some advantage over his predecessor. Apparently correct lenses, which have been worn conscientiously without relief, should always awaken the suspicion of some muscular anomaly. It should not be forgotten that small imbalances may be the result of spasm, especially when the general muscular tone is not up to the standard: with an improvement in muscular tone, the phoria often disappears. A heterophoria may not become apparent until after some accident or debilitating illness. Uncorrected, a heterophoria of considerable degree means a continuous expenditure of nervous energy. This may mean nothing to a phlegmatic person, but to a high strung individual, it may mean torture. There is a large number of

patients who possess orthophoria for distance and an unusual amount of exophoria for near. Many times this exophoria reaches eight, ten or twelve degrees or more; an imbalance due, in most cases, to weak interni rather than to over active externi. Convergence excess, it may be repeated, is, as a rule, accommodative. Divergence insufficiency generally is secondary to a progressive convergence excess. The convergent tendencies are in the ascendance in youth and the divergent tendencies in adult life. Convergence insufficiency frequently is accommodative and is met with, for example, in uncorrected myopes and in presbyopes who are wearing their first reading glasses. A careful search should be made for even small vertical errors. Among the difficult cases to handle are those with hyperopia and an exophoria, either for distance or near. Correction of the refractive error adds to the exophoria.

Many ophthalmologists are averse to the use of prisms in lateral phorias or openly condemn them, reserving their use for the vertical phorias. It is my personal belief, however, and in agreement with Posey, that prisms, bases in, should be prescribed for patients wearing reading glasses and showing a marked exophoria for near. Especially is this so when asthenopic symptoms persist in spite of an apparently correct presbyopic correction. Prism exercises are chiefly used to strengthen interni where latent outward deviations exist. During their use the action of the interni is enhanced, but whether a permanent result is obtained has always been a mooted question with the writer. Why should ocular muscles increase in tone and development as a result of temporary exercise? This is not true of other muscles of the body. Where the muscle weakness is due to some local or general debilitating cause, exercises may bring about a permanent result.

The longer one practices ophthalmology the more one is impressed with the fact that the best interests of the patient are conserved by a less frequent resort to operations. This is

true in general, but more particularly so in muscular anomalies. In muscle imbalance Reber has contended that if used conservatively, prism corrections ought to be of service in 75% of all cases and that tenotomy should be the last resort. Furthermore, that if properly studied and treated, not more than 2% to 4% of all cases should come to operation.

It is always advisable to prescribe vertical prisms less than the total amount of hyperphoria. In exophoria Posey finds prisms, bases in, of value, correcting one-third or one-fourth of the muscle error, combined with the ametropic correction, for near work.

A good working rule furnished us in correcting ametropia, associated with heterophoria, is to fully correct a hyperopia with convergence excess but in convergence insufficiency to correct only as much hyperopia as is demanded by the age of the patient and his occupation. In myopia, with convergence insufficiency, fully correct the myopia, but with convergence excess undercorrect the myopia.

Many oculists insist upon a knowledge of the muscle balance both for distance and near. Some go to the extreme in the correction of the revealed deviations. Their correction seems called for only when of a pronounced degree or when, after most careful testing and correction of the ametropia with spheres and cylinders, asthenopic symptoms persist.

DISCUSSION.—Dr. E. H. Higbee—There are a great number of muscle tests, all of more or less merit, but the one that has given me the most satisfaction is the one in which the Cogan Chart is used. We often find that the balance is not exactly in the horizontal or vertical meridian. In making muscle tests I always have the patient rested and make no other test that day. We all know that the results following correction of muscle imbalance are not very satisfactory. It is always a question how strong a prism to use. I have tried to keep within the four degrees recommended by the best authorities; if the patient requires more than four

degrees, I believe that a muscle operation is indicated.

CASE 1.—This patient had had all varieties of treatment, such as muscle operations, cycloplegics, complete rest, prisms and exercises, none of which had given him permanent relief. Upon examination I found, by the Cogan Chart, that the displacement was eight degrees, axis eighty. I divided this and put four degrees over each eye and had the prisms ground into his correction, which was a compound astigmatism. This was five years ago and I have seen the patient at least once a year since then. He still continues to wear the same correction and states that he experiences no discomfort whatever and is able to use his eyes for close work as long a time as he wishes.

CASE 2.—This patient was corrected with an eight degree prism at axis 25°. A young broker, had gone the rounds of all the specialists; suffered with intense headaches and backaches, and was wearing at the time I saw him, a corset for the relief of sacro-iliac disturbance. Altho he had a very low refractive error (R + 0.25 cylinder, axis 30° L + 0.37 cylinder axis 180°) he constantly complained of fatigue of the head and eyes. With this correction and the prisms ground in he has had entire relief for the past three months.

CASE 3.—A dentist. Was wearing R + 0.75 C — 2.75 cy. 180° and L + 0.50 C — 2.25 cy 180°. His displacement was corrected with 10 degree prism, axis 10°. I ordered four degrees over each eye. After wearing this correction he remarked, "I have not had so much relief in my life and feel like a different man." He still continues to wear these lenses and they were prescribed five months ago.

Dr. W. H. Luedde.—In recording deviation, the use of the term "degrees" may refer to the arc of ocular deviation or the degree of the prism angle used for its correction. The amount of deviation produced by a prism equals practically one-half of the angle of its surfaces. A prism is usually designated by degrees show-

ing the angle of its surfaces. Landolt has for many years contended that this confusion should be eliminated by adopting the angle of deviation as the basis for uniform notation. If Landolt's method were adopted the prism used to correct deviation should correspond in degrees to the deviation as measured on the screen by circles or points indicating a tangent of one or more degrees at a fixed distance.

Dr. J. W. Charles.—When the patient says that the line of the Maddox Rod is to the right of the light and we use the rotating prism and ask him when it comes on the light, we can readily get the measurement without confusing the patient. I must say, however, that the measurements for near, with most patients, are difficult. I have the instrument "Maddox Near Vision Phorometer" with red dotted line and green numbers, each number corresponding to a degree and I find that patients are very readily confused and seem to have a tendency, when they begin to employ near vision, to use the interni too much. I find a good deal of variation in these tests, where I don't find them in distance tests. I think the remedy for that is to repeat them several times when the patient is rested.

Dr. John Green, Jr.—Dr. Marlow has made some observations on the effect of prolonged covering of one eye on the degree of imbalance. Not rarely he found that the degree of heterophoria (lateral or vertical) was much greater than the original reading. The occlusion of one eye was sometimes kept up for days. It has always been an interesting question how best to manage those cases, in presbyopes, which show orthophoria or slight esophoria for distance and a good deal of exophoria (8° to 10°) for near. In such cases I have not hesitated to give prisms, bases in, incorporated in the reading glass, the prismatic strength being from one-half to two-thirds the total deviation as measured by Maddox Rod Screen Test for near. In vertical deviation of over 5° I believe that a graduated tenotomy or a carefully planned advancement of the ver-

tical recti is indicated. I have been impressed with Dr. Theobald's contention that it is very necessary to make an estimate of the vertical balance for near, as well as for distance. Not infrequently you will find that the two are not identical. I am not convinced that it is always wise, in the event of a low degree of vertical imbalance for near, where there is no vertical imbalance for distance, to incorporate prisms in your correction, at least until the patient has given the correcting lenses a fair trial.

Dr. F. E. Woodruff.—I am convinced that the first thing necessary is to determine the refraction under cycloplegia, in order to get an accurate measurement of the distance correction. After that is done, and the patient has worn a proper correction for distance for some time, then the measurement of the heterophoria may be made and proper prism correction ordered. Another necessity is that the glasses be properly centered. If the pupillary distance is slightly incorrect, it is not possible to get the proper prism effect. The means I consider most convenient for measuring heterophoria for near are Stevenson's and Walton's tests.

Dr. E. C. Spitz.—In all cases I think the muscle test should be taken a number of times very carefully. I always take it at least twice in each case and refer to the measurement afterwards before making any change in the lenses. In the matter of small vertical deviations I find that they are usually overcome by thoroly correcting the refraction. Exophoria is usually reduced by giving full myopic correction. The prisms of Landolt, referred to by Dr. Luedde, are made to measure degrees of deviation. I use the ordinary prisms of the test case and record the findings in degrees as measured by these prisms.

Dr. M. H. Post.—If you use the Maddox Rod test before you have made correction and you have a considerable difference in refraction of the two eyes, you get an entirely false reading. The poorer eye will adapt itself to the focus of the better one. In

that way you get your reading considerably off, so it makes it absolutely essential that you have proper correction before you make the Maddox Rod Test.

Dr. H. D. Lamb.—I agree with Dr. Woodruff and Dr. Post that the muscle test (whether with Maddox Rod or other apparatus) should be made with the patient wearing his full correction. Indeed, in my experience, it is best to defer such testing until the most accurate correction possible has been worn for several weeks. It is a well known fact that the large majority of these muscle imbalances, as determined at the first visits, disappear after wearing the proper correction for a few weeks. It seems that in some cases a good result is not obtained because the prism is not worn in sufficient amount. I have recently observed a patient with six degrees of exophoria at 20 feet and sixteen degrees of exophoria at 14 inches, but no hyperphoria. Varying strengths of prisms, bases in, were tried for near work, in the office and at home. None were comfortable for any length of time until six degrees, bases in, right and left, was put on when entire comfort, even in prolonged near work, was obtained.

Dr. W. H. Luedde.—With reference to the amount of hyperphoria requiring or susceptible to correction, I would like to report two cases. The first one seen thirteen years ago showed a hyperphoria of ten degrees corrected by four degree prism, base down, on one eye and a six degree prism, base up, on the other eye. His age was then 33 years. He had never worn a correction for this condition. He promptly accepted his new glasses and commented on the benefits of binocular vision, based on his own observations. I had supposed his capacity for binocular vision was lost as he stated that he had never been able to use the two eyes simultaneously. He had worn, previously, only a correction for his compound hyperopic astigmatism and anisometropia which required + 4. sphere right and + 2.50 sphere with + 1. cylinder, axis vertical

left. He had worn such a correction since childhood. He recently required the usual addition for presbyopia but accepted no change at all in the degree of the prisms combined with his hyperopic correction which continues to be worn with perfect comfort.

The second case was a Circuit Judge, aged 63, who was much confused in his reading vision. Apparently this was due to one-half degree of left hyperphoria, for its correction brought him entire comfort. A readjustment for increased presbyopia four years later revealed that every indication for correction by prisms had disappeared. The attempt to add it to his new correction produced actual discomfort. It would appear that each of these cases must be a law unto itself, and that no hard and fast rule can determine how long a given correction with prisms will retain its maximum efficiency, which experience teaches is likewise true of corrections made up of spheres and cylinders.

Double vision when revealed by colored glass over one eye means a heterotropia rather than a heterophoria. To reveal the latent lack of muscular balance present in the latter condition, it is necessary to use the Maddox Rod or similar device to break up the instinctive fusion of images of the two eyes. In border line cases we may occasionally get doubling with either method depending apparently upon the amount of fatigue. Objection has been raised to the use of a tangent screen because the selection of the point at which the secondary image is located interferes more or less with primary fixation. For this reason, the late Dr. John Green preferred to accept the simple statement of the patient in inches or feet as to the distance between the primary and secondary images. This statement had no absolute mathematic coefficient but its comparative value in subsequent examinations for the same patient under the same conditions was probably equal to measurements recorded by any other method. The position of prisms is properly designated by the position of the base. The term "axis"

is reserved for cylinders and not used in indicating the position of prisms.

Dr. J. W. Charles.—When one eye does not see quite as well as the other, if the difference in vision is not too great, it is better to put the Maddox Rod over the best seeing eye and fix the light with the worse seeing eye. It makes the test more accurate.

Dr. John Green, Jr.—It is important, as Dolman has recently pointed out in his paper on the Maddox Rod Screen Test, that the patient should fix the light and not the rod.

Dr. Wm. F. Hardy (Closing).—In regard to what Dr. Woodruff has said, I am of the opinion that the Stevenson test for near is somewhat of a check on the amount of presbyopic correction to give the patient. There is no fixed rule for adding a certain amount of plus glass for reading in the individual case. If for instance in a 55 year old patient a plus 2 sphere is added there may result a 3 or 4 degree exophoria for near. It may give greater comfort than a plus 2.5 sphere added, which is the strength ordinarily given at the age of 55. It will give more comfort for the reason that with a 2.5 sphere added the exophoria may equal 7 or more degrees. With reference to Cogan's Chart, I am very anxious to hear from Dr. Higbee about it, because I must confess I am not familiar with its use. If it gives better results I wish to employ it. Dr. Luedde made mention of Landolt's method of prism measurements. It would appear that in clinical work prism estimates are relative affairs, just as tonometric findings are relative estimations of the actual intraocular tension. In both instances a basis is furnished for making clinical comparisons. Dr. Post mentioned the difference in vision in the two eyes and the estimation of the esophoria in such cases. I feel that the vision of the poorer eye should be brought up to or as near the other as possible before making prism measurements, as a large difference in visual acuity would naturally militate against exactness. One should not be in a hurry to prescribe prisms and it is my custom

to loan a pair of prisms for home use or in work and let the patient try them out thoroly. It may be that the strength will be varied from time to time until I have found that which is seemingly the best. In exophoria I follow Posey's advice and correct one-fourth to one-third of the error. Hyperphoria of 5 to 6 degrees certainly calls for operation in the majority of cases.

Dr. E. H. Higbee.—Cogan's chart is a chart laid off just the same as an astigmatic chart; it is also laid off in circles. The centre of it has a hole 1 cm. in diameter, behind which is a light. The chart is placed 20 feet from the patient who wears a red glass over one eye. If there is a displacement of the images the patient will tell you on what meridian he sees the red light. By simply correcting with prisms until these lights blend you have your correction.

Review of Recent Literature on Muscular Anomalies.—Dr. H. S. Hughes read this paper but there was no discussion.

JOHN GREEN, JR.,
Secretary.

SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA

February 19, 1920

DR. G. ORAM RING, Chairman

Double Extraction of Dislocated Lens

DR. HOWARD F. HANSELL reported a case operated on as follows:

Double iridectomy, March, 1918; R. lens extracted in May, 1918; L. lens extracted in November, 1918.

The visual result on February 19, 1920, was:

R. + 9 C + 3 ax. 155° = 6/5.

L. + 10 C + 1 ax. 130° = 6/5.

The patient's father and mother were first cousins and the children of twin sisters. Her parents had eight children. After each child reached the age of thirty-five the sight became affected. One sister and herself with cataract, eldest sister blind for twenty

years. Sight of all three brothers bad, cause unknown. A sister was operated on successfully for cataract in one eye. The surgeon refused to operate on the second eye. Parents' sight good.

Blindness, Traumatic and Psychic.

DR. HOWARD F. HANSELL read the paper published in full on p. 512.

DISCUSSION: Dr. F. X. Dercum said he experienced some diffidence in addressing the Ophthalmological Section of the College. He realized that he was speaking in the presence of those who are especially qualified to express opinions on ophthalmologic matters. However, it seemed to him there was only one explanation possible for the case which Dr. Hansell had so beautifully presented. In the first place, according to the ophthalmologic findings, the injuries to the right eye were not of such nature as to account for the blindness in that eye. Secondly, the blindness in the left eye, which was normal to all examinations, came on very suddenly at a much later period and bore a close relation to the unfortunate experience which the patient had had with the compensation board. The light reflex, and in this Dr. Hansell was in accord, was well preserved in both eyes. This meant that the tracts, as far as the primary optic centers and inclusive of these centers, must be functioning normally. Further, if a lesion existed back of the primary optic centers in either hemisphere it would, in order to give rise to blindness, involve either the optic radiation or the cuneus. This would, of course, give rise to a homonymous lateral hemianopsia, a form of blindness which was clearly not present in Dr. Hansell's patient.

The case, in Dr. Dercum's judgment, was one of hysteria and must be classed with the shell-shock cases observed during the Great War. Like all cases of hysteria, the symptoms presented bear no relation to the facts of anatomy or indeed of physiology, and to him there is no other conclusion possible than that the blindness is psychic.

The fact that there was now an im-

provement in the vision, especially in the left eye, was in keeping with the improvements observed in functional cases. It would appear as tho the sense of injustice which the patient experienced from a reduction of his compensation aggravated the symptoms from which he suffered, i. e., it led to an emphasis, a subconscious exaggeration, of his injuries and wrongs. Finding later that no change was taking place in the matter of his compensation, the symptoms were again growing less, very much as they do in litigants in the courts whose claims are non-suited or otherwise come to naught. Dr. Dercum was reminded also of the interesting experience among our troops in France as reported by Surgeon-General Ireland, who stated that of 2,300 cases of shell-shock, with symptoms of deafness, blindness, palsies and other most diverse phenomena, 2,000 recovered on the very day of the Armistice.

Dr. William M. Sweet said that he examined the eyes of the patient the morning following the loss of sight in the left eye, and at that time there was faint light perception in the upper inner field of the right eye, but no light perception in the left. The pupils were equal and responsive, and, except for the choroidal rupture in the right eye, the eyegrounds were normal. At an examination a few days ago the vision had returned to 20/70 in the left eye. Dr. Sweet considered the case to be one of psychic blindness, secondary to the shock and anger of the boy when his pension was reduced to a mere pittance, and believed that vision would ultimately return to normal in the left eye, with some sight in the right.

In discussing Dr. Hansell's paper, Dr. Risley said he was deeply interested in the report of Dr. Hansell's case. He had already reported eight examples in which blows upon the orbital ridge had produced serious impairment of vision, followed by secondary atrophy of the optic nerve and complete or partial blindness. They will be found in the published *Transactions of the American Ophthalmological Society*. His explanation at the time was that the force of

the blow on the brow or the anterior segment of the skull was transmitted thru the bony structures to the foramen lacerum and to the pathway of the nerve thru its bony groove at the base of the skull, probably pinching the nerve. He believed that this was the explanation in the case under discussion, and was inclined to explain the temporary blindness of the fellow eye by the less serious character of the injury transmitted to that optic nerve, so that repair was possible. He did not, therefore, think it was necessary to resort to the theory of "malingering" to explain the situation.

Vernal Conjunctivitis

DR. EDWARD A. SHUMWAY showed a case of vernal conjunctivitis of unusual severity, in which the growths on the palpebral conjunctiva had been successfully removed by five applications of radium over a period of six months. The dosage varied from 20 to 50 mg. and the exposure from 15 to 20 minutes in each upper lid. Vision was 5/5 in one eye and 5/30 in the other, the reduction being due to a corneal macula from ulceration, which had occurred before the radium treatments were instituted. In addition to the local reaction in the form of erythema of the skin, and temporary loss of the eyelashes following the radium applications, he had noted the formation of small localized abscesses of the conjunctiva of the lower lids, which required incision.

Dr. Posey said that he had recently had under his care a case very similar to Dr. Shumway's in which the radium treatment had been most successful, the hardened hyalin nodules gradually disappearing from the conjunctiva. In this case, however, the radium applications were followed by abscesses in both lids, which led to the loss of a number of the cilia.

Dr. Holloway stated that he has previously referred to two cases of vernal conjunctivitis, in which successful results had been obtained by the use of radium, and he was only too glad to verify Dr. Shumway's statements in regard to the efficiency of this

method of treatment. He thought, however, attention should be called to the observations of Luedde in regard to the beneficial results obtained by the local use of fibrolysin. This observer has recorded a number of instances in which the local instillation of this drug has given rise to very rapid and in some instances apparently permanent results. In some cases he has felt it expedient to precede the local installation of fibrolysin by a drop of holocain.

Dr. Holloway stated that he had been keeping in reserve an ampoule of fibrolysin for a case of vernal catarrh, but none recently has come under his observation in his private work. For a time during the war this drug was off the market and he was unable to say whether it could be obtained at the present time.

Ocular Pemphigus.

DR. WM. CAMPBELL POSEY read the paper published in full (p. 507).

DISCUSSION.—Dr. Burton Chance stated that he has been interested in the subject of pemphigus for many years, since the time of his first case, which was diagnosed as one of "essential shrinkage of the conjunctiva," because of the absorption of the tissues and from consequent contraction, until there was an eruption of true pemphigus vesicles. In his opinion, from the account given, Dr. Posey's case is undoubtedly one of pemphigus. Without criticizing the diagnoses made by the clinicians mentioned, it might be of interest to repeat what Dr. During remarked when he was consulted about Chance's case many years ago. That eminent dermatologist stated that the differential diagnosis would always be most difficult because the two diseases are so very rare; it was his belief, however, that the ophthalmologist would be consulted more likely by cases of pemphigus than by those expressing phases of impetigo herpetiformis. While at the General Hospital of the Army at Cape May a soldier had been assigned to Dr. Chance who had been affected while in France. There had been much uncertainty over the diagnosis, but Lieut. Whitman, from his

most careful and painstaking study of the case, all of which was in consecutive detail in the clinical record, had concluded in the face of the opposition by competent dermatologists that the disease was pemphigus. After the man's arrival in this country ample opportunities arose for Dr. Chance to confirm Lieut. Whitham's diagnosis, and the case was reported in detail by Capt. Connor and Capt. Burkholder prior to their sailing for France.

Dr. Shumway spoke of the great rarity of the cases of pemphigus, and said he had seen three well-marked cases, one of which he had demonstrated before the Section in 1909. In this patient there was widespread involvement of the skin, not only of the trunk and extremities, but also of the scalp, and the patient had died later from exhaustion at the Philadelphia Hospital. A second case had been treated at first for trachoma, and an operation done for ectropion; but lesions were found later in the throat and the true nature of the condition was evident.

Dr. Shumway discussed the question of the identity of essential shrinking of the conjunctiva and pemphigus, and said originally they were held to be separate conditions, but that most authorities, especially eye surgeons, now considered them identical, though many dermatologists disputed this view. In trachoma the differential diagnosis was at times difficult, but the presence of pannus would point definitely to trachoma. Treatment was unavailing, and operative interference apparently hastened the process.

Dr. Posey, in closing, said the first case of pemphigus he saw was at Moorfields, in a middle-aged man, in whom the inflammation had run a much more chronic course than in the case just reported by him. Here the malignancy of the inflammation was intense, the two opposing surfaces of the conjunctiva becoming glued together despite all his efforts in but two or three months. There evidently are two distinct types of the disease.

Essentials of Perimetry.

DR. LUTHER C. PETER read a paper

upon this subject which will be published in full in this Journal.

DISCUSSION.—Dr. Geo. S. Crampton said that perimetry as practised at the present time, while much more accurate than it was a decade ago, is still subject to a considerable number of errors even in the hands of those who have taken pains to improve their technic in every possible way, and any attempt to standardize the nomenclature and practice of the art must meet with our approval.

The question of properly illuminating the test object is of considerable importance, especially now that there is an increasing tendency to use objects which subtend very small visual angles, as it has been shown that very small test objects are more sensitive to variable illumination than the larger sizes.

While we have found ordinary daylight too variable for our test cards, most of us have continued to use it for perimetry, largely because of the difficulties involved in properly lighting our instruments or tangent screens. This subject is being studied at the present time by a committee of the American Ophthalmological Society, and it is probable that suggestions for a standard method will be announced shortly.

The recently invented daylight screens will, no doubt, be of great service in illuminating our test objects in their true colors, but they are very wasteful of energy and may not prove practical for this reason in the illumination of large tangent screens unless some means be devised for local illumination upon the surface of the test object carried in the hand. While transillumination of the test object has not proved entirely successful up to the present time this method may yet prove of value when more fully studied. Unfortunately it is difficult, or I might say impossible, to obtain spectrally pure translucent screens, and even our best pigment papers are apt to surprise one who views them through a spectroscope for the first time.

Fortunately, Clifford Walker and others have demonstrated that we can,

as a rule, get along very nicely without using colors at all, as color defects are almost always represented by form defects when the visual angle is made small enough.

The factors of preexposure and surrounding field should be considered in relation to their effect upon the outlines of the visual field. It is a question yet to be decided whether these two factors which Drs. Ferree and Rand have demonstrated to have a marked bearing on the limits of their fields as taken in the laboratory will have an appreciable influence upon the art as practised by the ophthalmologist. Certainly nothing should be omitted which will give us better results in our every-day work.

In reference to the dimensions of the test object, it is gratifying to note a growing tendency to speak of the visual angle subtended rather than to refer to an object of a certain size, as in the latter case the screen distance must also be mentioned or the size has no meaning. In any case round disks only should be used, as the angle can be readily found if the diameter of a round disk is stated, together with the distance at which it is used.

Clifford Walker's careful work in giving us graphic charts whereby the visual angle for test objects of varying sizes and distances can be told at a glance should not be overlooked.

He has considered most of the errors that may affect our perimetric results, and has shown how they may be eliminated to a considerable extent at least. If the graphic chart is not at hand the visual angles can be readily computed by multiplying the disk diameter in millimeters by the constant 3437.7 and dividing the result by the distance in millimeters. This will give the visual angle in minutes.

Walker states that in using a visual angle below 7.5 minutes (0.6 mm.) at the usual perimeter distance the size of the disk supporter becomes disproportionately large and may mislead the patient. Below a five-minute angle it is better to change to a campimeter or a perimeter of greater radius.

It was found that a disk of about 1 mm. diameter had the widest range of usefulness, and that it was most convenient to use the 1.2 mm. disk and distances of 1,000—1,500—2,000 and 2,700 mm.

Dr. C. E. Ferree and Dr. G. Rand, of Bryn Mawr College, said that the difficulty of getting reproducible results in determinations of the color sensitivity of the peripheral retina is a common complaint among laboratory and clinic workers. The actual distribution of retinal sensitivities is only one of the factors influencing the results of a perimetric or campimetric determination. By varying the conditions under which the work is done the zones of color sensitivity may be made to have almost any extent within the limits of the field of vision, and to vary radically in shape.

The variable factors which influence the apparent limits of color sensitivity are, so far as we have been able to determine, the wave-length and purity of the stimulus, intensity of stimulus and the visual angle, length of exposure of the eye, accuracy and steadiness of fixation, the general illumination and state of adaptation of the retina, breadth of pupil and the brightness of the preexposure and of the background or surrounding field. Only a few of these can be considered here. (1) The most important factor is intensity of stimulus. With very high intensities the limits of red, blue and yellow are coincident with the limits of the white light vision. Green cannot be made to have so wide an extent. With stimuli of medium intensities of equal energies the limits of red, blue and yellow interlace or criss-cross. Again, the limits for green are narrower. The conventional clinic rating from widest to narrowest of blue, red and green is, with the exception of green, a function of the intensity of the stimuli employed. A decrease of intensity of the stimulus not only narrows the limits, but, because of the irregular distribution of sensitivities in the different meridians, causes a marked change in the shape of the zones of sensitivity. (2) Breadth of

pupil is effective thru influencing the clearness of imaging, the amount of light entering the eye and the degree of excentricity at which an image may be formed on the retina. (3) The brightness of the surface to which the eye is preexposed may change the limits in certain meridians as much as 20 degrees. A preexposure lighter than the color gives a dark and one darker than the color a light after image. These achromatic or brightness after images change profoundly the saturation of the color sensation, also its hue. (4) A background or surrounding field lighter or darker than the color produces a similar but not so great an effect on the limits. In this case a disturbing achromatic effect is produced by physiologic induction or contrast. The variable effects of brightness of preexposure and surrounding field can be eliminated only by making both of the same brightness as the stimulus color. (5) When pigment stimuli are used the intensity of illumination of the perimeter arm conditions the intensity of the stimulus light. Also, unless this illumination is kept constant and is uniform for all points on the perimeter arm the variable effect of preexposure and surrounding field cannot be eliminated. That is the shade of gray which is needed to match the color in brightness, changes with change of illumination.

All of the above-mentioned factors can be standardized and controlled. When this is done the limits can be reproduced within a very remarkably small limit of error. We have devised and are having constructed a perimeter by means of which equal illumination of the stimulus is secured at every point of the arc, and the variable effects of brightness of preexposure and surrounding field can be eliminated with an ease and speed of manipulation which, we believe, is feasible for office and clinic work.

Discission of Lens in High Myopia.

DR. J. H. DEWEY said the opportunity it affords of observing the characteristic changes found in high myopia in an eye rendered practically em-

metropic by operation was his reason for presenting the case rather than the results of the operation or as an advocate of this procedure.

He rather tried to dissuade the patient from the operation, and the dangers were explained, but all that interested him was getting away from the thick lenses, and he was perfectly willing to assume all the risks.

Before operating the vision in R. with S. — 18 = 5/20. L. S. — 20 = 5/20.

The knife needle was entered thru the sclera in all the discissions. Only after one was there any reaction. This one was followed by some pain, with slight ciliary injection the next day, but entirely subsided in twenty-four hours.

Several operations were done on the left eye and five on the right one. The first operation on the left one was performed on June 18, 1917, and the last one September 7, 1918. The first one on the right eye January 25, 1919, and the last one December 15, 1919.

The vision now in R. with S. + 0.50 \odot cyl. + 1.00 ax. 180 degrees = 5/9 L. with S. + 0.50 \odot cyl. + 1.00 ax. 180 degrees = 5/7 full, and several letters of 5/5. The improvement in vision is rather better than stated in the numerous tables published showing the results which should be obtained after removal of the lens in high myopia, and the correcting lens corresponds closely to the one that should be expected, according to Hirschberg's table for the reduced eye.

That the operation has no influence on the increasing myopia is unfortunately already demonstrated in this case, in which the myopia has increased in the left eye one diopter in a little over a year.

As to the danger of increasing the tendency to detachment of the retina there can be no question, but statistics vary greatly on this point.

In discussing cases adapted to the operation, Dr. Dewey found only those of high myopia advocated. It occurred to him that the operation might have its most legitimate field in a class of cases in which the myopia runs from 7D. to 15D., and the vision with cor-

rection is between 5/20 and 5/50, the patient still able to read fine type.

To have this vision doubled would be of great advantage, and it would seem reasonable to suppose that the danger of subsequent retinal detachment would be less than in the higher myopes.

Cocain Poisoning.

DR. HAROLD G. GOLDBERG reported the case of a patient who had been operated on a short time before under cocain anesthesia without any ill effects, but upon the occasion reported, more than the usual number of drops had been used, which he believed had passed through the tear duct and an excessive amount of the drug absorbed. The patient showed typical signs of cocain poisoning, but recovered without injury to the eye or general health.

In discussing Dr. Goldberg's paper, Dr. Risley said he had seen no striking example of serious cocain poisoning, but had not infrequently witnessed what appeared to be hallucinations which he ascribed to the constitutional effect of the cocain after repeated instillations of 4 per cent. solutions during more or less prolonged operations. He had, however, soon acquired a sense of anxiety lest the profound local effect witnessed after the instillation of 4 per cent solutions of the earlier preparations of cocain should disturb the prompt healing of the wound. In the earlier preparations which came into our hands he thought there was a degree of sudden blanching of the tissues, with conjunctival edema and infiltration of the epithelium of the cornea, disturbing its transparency, to an extent he had not witnessed in the 2 per cent solutions which he is habitually using during later years. Indeed, the difference was so striking that he was led to inquire whether there might not be some change in the mode of the manufacture of the drug as now present in the market.

Dr. Peter said: Apropos of the case which Dr. Goldberg has reported, he wished to cite an instance of cocain collapse which occurred several years

ago from the use of tabloids of homatropin and cocain. The patient was a man of about thirty-five. Two tabloids were introduced into the culdesacs, each tabloid containing one-fiftieth of a grain of homatropin and one-fiftieth of a grain of cocain. As was his usual custom the patient was instructed to compress the puncta for about five minutes. He evidently failed to follow instructions, and in about five minutes suddenly collapsed in the office and dropped to the floor pulseless and the respiration ceased. The recovery was rather prompt after the patient fell into a recumbent position. He had no reason to suspect that this was of psychic origin, inasmuch as the patient had had drops instilled into his eyes on former occasions. It was a typical cocain collapse. The maximum amount of cocain that the patient could have received from these tabloids was one-twenty-fifth of a grain.

Contusion of Eye with Oil Droplet Staining of Conjunctiva.

DR. H. MAXWELL LANGDON related the case of J. K., male, aged forty-one years, who was first seen January 19, 1920, with a history that two hours before he had been struck in O. S. with a jet of heavy gas oil coming from a tank under the pressure of between 50 and 60 pounds to the inch. O. D. was perfectly quiet. In O. S. the lids were slightly swollen, the conjunctiva greatly chemosed and discolored in two irregular patches running horizontally, one above and one below the cornea, each having its border nearest the cornea about 3 mm. from the limbus. There was a slight abrasion of the cornea in its lower portion, otherwise the eyeball externally and internally was negative. O. D. V. = 6/VI. O. S. V. = 6/X. under the loupe the masses of discoloration were found to consist of many minute droplets of oil, which had been forced into the conjunctiva by the great pressure. The course of the condition was as follows:

A great increase in the chemosis of the conjunctiva and much swelling of the orbital tissues, so that the eyeball

was not only moderately proptosed, but there was a distinct loss of motility. In four days under constant ice compresses the swelling had subsided and motion was much better. Within ten days after the accident conditions were normal except for some residual staining of the conjunctiva, which has since, under dionin and hot compresses, entirely disappeared. With a $-.50$ spherical $V = 6/V$.

The interesting feature in this case is the fact that in spite of the great pressure, sufficient to drive the oil into the conjunctiva, the eyeball itself suffered no injury except the very slight abrasion of the cornea.

Dr. Holloway stated that in Dr. Langdon's interesting case the manifestations were most unusual, and it was the first time he had an opportunity to observe a case of this character. Not infrequently patients come to a clinic stating that they have been impressed by fluids under high pressure, but almost invariably one finds that the statement is incorrect or not wholly true. He then cited an instance in which the patient's first statement was that he was struck by a stream of water under high pressure, but subsequent events proved that he had really been struck by a brass valve driven out by the force of the pressure.

Deep Peripheral Keratitis.

DR. W. T. SHOEMAKER reported Mrs. M. A., seen at service at the Pennsylvania Hospital on February 9, 1920, with the following history:

Four days previous to this a dimness of vision of the right eye had been noted. (The patient had visited the dispensary for refraction in September, 1919, when O. D. V. = $6/VI$.) There had been no pain or tenderness of O. D., and the left eye seemed in every way unaffected.

Examination of O. D. showed a very slight enlargement of one or two of the lower conjunctival vessels; no ciliary injection whatever. In the cornea there was a triangular patch of infiltrate, the base being at the lower limbus and the apex in the center of the cornea, the base being 8 mm.

across. It was gray except for a band running parallel with the limbus, about 2 mm. broad, which was decidedly reddish in tint, suggesting a "salmon patch." The corneal epithelium was unbroken. The pupils were equal and responded promptly to light and other stimuli. There was no discoloration of the iris of O. D. Ophthalmoscopically the media were clear and the fundus unaltered. Under the loupe the infiltrate was seen to consist of many vertical parallel lines irregular in outline but very regular in their vertical course. The "salmon patch" was seen to be made up of many fine capillaries growing into the corneal parenchyma from the limbus. Physical examination showed no organic changes in any of the viscera. The complexion of the patient suggested a moderate anemia, and the blood examination showed a hemoglobin of 75 per cent; red blood cells, 3,140,000; white blood cells, 9,000. The Wassermann was weakly positive. The patient has been placed on Bland's pills, mixed treatment and locally atropin and dionin. The sclera in the lower portion has become a little more congested, and there has been decided increase of vascularity in the "salmon patch," so that the tint is nearer carmin than "salmon."

In attempting to identify the type of keratitis, which was obviously interstitial in character, it was narrowed down to one of three possibilities: The so-called deep marginal keratitis, described by Fuchs; sclerosing keratitis, and a type of interstitial keratitis mentioned by Roemer, but given no definite name. It has seemed that the keratitis marginalis profunda might be excluded on account of the age of the patient, as it usually occurs in elderly people, the involvement of so much of the cornea, the fact that it usually occupies the upper portion of the cornea and because of the lack of inflammatory reaction. Sclerosing keratitis is preceded by a patch of scleritis, being a complication of that condition, and the patches are irregular in shape. It seems, therefore, that we should deal with that form of interstitial keratitis mentioned briefly by

Roemer, who simply says, "The entire opacity is found on the lowermost part of the cornea, where it assumes a triangular form, with the apex directed upward."

In view of the negative physical findings, except for the moderate anemia and the weakly positive Wassermann, it seems most likely that this case is specific in origin. As to whether it is hereditary or acquired it is impossible to say; no other signs of hereditary syphilis are present; the patient is one of four children, all living and well, with no miscarriages in that generation. She has had two pregnancies and two children, both living and well.

Dr. Posey said that he remembered presenting to the Section two cases of triangular opacity of the cornea in syphilitic subjects several years ago. The opacity in each instance had appeared some time after the inflammation had first inaugurated itself. He thought it a matter of clinical experience that in cases of commencing keratitis parenchymatosa the cornea frequently becomes infiltrated in localized areas, and that sometimes a triangular opacity appears at the margin of the cornea and retains that form for a time before extending over the entire membrane. This peculiarity in form is due to a syphilitic affection of the marginal loop of blood vessels, and it is not unlikely that the persistence of the triangle in the two cases presented was dependent also upon vascular causes.

In discussing Dr. Langdon's case, Dr. Risley said the condition of the cornea recalled the group of cases he had already published in which these conditions had rapidly recovered under the administration of the pulverized thyroid gland of the sheep. In a word, the general appearance of the patient and the corneal condition suggested to him a case of hypothyroidism.

Extraction of a Morgagnian Cataract.

DR. G. ORAM RING presented a brief report of an interesting accident in connection with the extraction of a Morgagnian cataract.

The patient, a male, aged sixty-three

years, weighing 180 pounds, of ruddy complexion and good, general health, had been blind in both eyes from cataract for nine years.

The lenses were homogeneously gray, with a conspicuous series of dense white dots of capsular proliferation. The nucleus was invisible. Perception and projection were good. Dilatation under mydriatic was moderate.

Operative treatment had been declined previous to December, 1919, and no remedy other than the soporific toxin of Christian Science had been utilized.

A preliminary iridectomy was performed early in December last, the healing of which was entirely uneventful.

One month later, under cocain, the usual flap, including the upper third of the cornea and a small amount of conjunctiva, was made.

Following the application of the cystitome to the capsule because of the patient's nervousness, the lids were closed and the operation suspended for a moment.

Upon opening the lids the entire pupillary area was perfectly black (the liquid cortex having completely extruded itself), except that the dense, hard nucleus had fallen down to the base and temporal side of the capsule, back of the outer pillar of the iris. It becoming evident at once that corneal pressure would not complete the extraction, the 5 mm. nucleus was delivered by a small loop without accident.

A slight but temporary cystoid cicatrix was the only complication of the healing. Corrected vision was 20/30.

Dr. Ring thought it possible that had the interval for rest not been utilized the nucleus might have been extruded with the onrush of the milky cortex.

Reference was made to the return of sight in Morgagnian cataract by liquefaction and absorption or by the bursting of the capsule and the absorption of the semiliquid matter, which discharged itself into the anterior chamber.

Dr. Chance stated that he was very

much interested in Dr. Ring's account of his case of Morgagnian cataract. He himself had had two quite interesting cases of hypermature cataract which he reported several years ago. He cannot help but be grateful that Dr. Ring had succeeded in snatching a case from the clutches of the Faith Curists, for the history of pilgrims to faith cures discloses that many instances of recovery from blindness in those known to have had cataracts were truly cases of hypermature cataracts which had undergone dissolution. He was especially interested in Dr. Ring's patient, in so far that that gentleman had been his own first music teacher, and he cannot help but deplore the misfortune that so charming and useful a person had been consigned to darkness for so many years, when it would have been entirely possible for him to have recovered his sight and continued his musical practice.

J MILTON GRISCOM, M.D.,
Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY

February 16, 1920

DR. ALFRED N. MURRAY, President.

Ocular Manifestations in Encephalitis Lethargica.

DR. SYDNEY WALKER reviewed the recent literature of this subject.

In one of the two cases he had, the ocular symptoms had been very prominent. This case, seen by Dr. Hamill, ran a more or less typical course, developing a divergent palsy, and a loss of his accommodation early in his illness. Just before his illness a small correction obtained 20/20 vision. At that time there were no fundus findings, and just recently he examined him again with a like result. The divergent palsy had remained stationary, but there had been a partial return of the accommodation.

The second case was somewhat less definite in character. The patient, 23 years of age, had been suffering with what his physician had termed a

nervous breakdown, and while in this condition had been semicomatose for a period of ten days. He came to the office some days after, complaining of an inability to read and upon examination he found a total loss of accommodation and a convergence insufficiency. Otherwise the eyes were negative. These were the only ocular symptoms present at any time during his illness.

CONCLUSIONS.—1. The ocular manifestations in encephalitis are numerous, and are not constant.

2. The virus appears to have a predilection for certain cranial nerve nuclei.

3. The third nerve is most often involved, alone or in association with other cranial nerves.

4. Lesions of the optic nerve are not one of the manifestations of this condition, but might be one of the complications.

DISCUSSION.—Dr. George W. Hall said that the ocular manifestations were not infrequently the prodromal symptoms, and for that reason the oculist was likely to overlook the particular condition that he was dealing with at that time. The temperature might not be high. The patient might complain of slight drowsiness; he might have a paralysis, or a transitory paresis, perhaps of the internal or external rectus, and the diagnosis at that time might not be easy to make. In a few days that condition might abate to some extent; it might disappear. On top of that we found possibly facial paralysis supervening, and then lumbar puncture would aid us in clearing up the diagnosis.

Of the ocular manifestations, drooping of the eyelids was perhaps the most common; next was paresis of the external rectus, and to a less extent other ocular manifestations. But the partial third nerve paralysis in the large percentage of cases was most frequently present.

He reported a case which entered his service at the County Hospital on March 31, 1919. At that time both lids were drooping; the palpebral fissures were very much

narrower; the pupils responded to light very sluggishly, and were slightly irregular; the right pupil was larger than the left. The conjunctiva was injected; nystagmus was present, and on April 5, the right eye deviated to the right and there was more decided ptosis on that side. On the 7th day patient complained of complete blindness in both eyes which seemed to have developed rather suddenly. He had at that time complete external and internal ophthalmoplegia. He also developed facial paresis on both sides. There was deafness in the left ear, to the watch tick. On the 8th, the next day, the right and left eyes reacted sluggishly to light. The nerve head was normal. On the 9th day the patient's eye grounds were checked up by Dr. Cushman, and she found the disc and blood vessels normal at the time. On the 9th day patient could count fingers in front of the eye. On the 10th there was very good movement of both eyes.

About spinal fluid, there might be differences between the findings in the spinal fluid of polioencephalitis or poliomyelitis and encephalitis lethargica. The spinal fluid in some of the most severe cases of lethargic encephalitis was perfectly normal. In those cases which showed extreme delirium, which gave an exact picture of delirium tremens plus eye paresis, the spinal fluid was absolutely normal. He had seen some six or eight cases of that type. A cell count was made on two or three different occasions, and never more than six or eight cells per cu. mm. were found in the spinal fluid. In those cases, however, which showed marked involvement of the basal ganglia, that is, complete bilateral facial paralysis, with more complete ocular findings, there was a cell count of 250 or 300. In such instances tubercular meningitis was considered in differential diagnosis.

Dr. L. J. Hughes, of Elgin, Illinois, reported a case he had under observation at the present time of a man, 35 years of age. Three weeks ago he was taken with pain in his stomach and a local physician diagnosed his case as

one of stomach trouble and put him on appropriate treatment. He came gradually worse and went on developing a lethargic state until he was practically comatose. He developed lateral nystagmus and complete blindness. He saw him the latter part of last week for the first time. The nystagmus was very marked. He had bilateral facial paralysis, which was not complete but quite marked. He had some difficulty of speech. He had slight ptosis of the lids at the time. There was no divergence, however, of the eye, but the fundus findings were plainly marked. There was rather marked edema of the retina in each eye, with some slight tortuosity of the vessels. He had been totally blind, and his condition was beginning to improve. His nystagmus was becoming less; his vision was returning. He was seen by Dr. Pollock who made a diagnosis of lethargic encephalitis. The findings were practically those given by the essayist. The treatment in this case was 30 grains of aspirin, and 30 grains of bicarbonat of soda, every 4 hours.

Dr. Frank Brawley reported what he considered a milder case than any which had been reported. It was in a case of influenza which was followed by pneumonia. There was complete third nerve paresis, with the usual lack of any accommodative power. At the time he saw the patient there was no diplopia, but the pupils were completely dilated and fixed. There was nothing to be seen in the fundus, and altho he suggested the possibility of encephalitis to the attending physician, he said he was not able to find any symptoms outside of the eye condition. At the time he saw the case there was beginning to be improvement, the diplopia had disappeared, and there was beginning return of accommodative power. The pupils still remained dilated and fixed.

Dr. Thomas O. Edgar, of Dixon, Illinois, reported a case of encephalitis lethargica which he was called to see on December 20, 1919, three days before the patient's death. E. C. F., a girl, aged 15, two weeks previously had had a discharge from the nose, follow-

ing which she became sick; at times complained of a headache, especially in the right frontal region. About December 10, according to her physician's report, the patient exhibited jerky or almost chorea-like motions, but a few doses of bromids quieted her; since that time she was always drowsy, but answered questions intelligently and promptly. For the three or four days preceding December 20, the patient was unable to cough up any of the mucus, which accumulated in her throat. Heart action and lungs had been normal. She had a slight fever. Patient had complained of diplopia for a few days. Pupils had been unequal, the right one being larger than the left. When seen by him, the eyes were partially open, but turned up; patient was unable to rotate eyes downward; fundi normal; the pupils were unequal, the right one being the larger. They reacted to light, but motion limited. A culture made from the middle meati of the nose, showed cocci arranged in pairs, a few chains and irregular groups. Suction failed to bring out any discharge from the sinuses. The following night, the patient's temperature rose to 105° and death occurred on December 23.

Wells P. Eagleton, in the *Annals of Otolaryngology and Rhinology* for September 1919, called attention to two points: First, the frequency of ambulatory patients; secondly, the lack of reference in the literature to the involvement of the eighth nerve, particularly of the vestibular apparatus. Of 7 cases seen by him, 4 were ambulatory. All of these ambulatory cases exhibited a demonstrable disturbance of the vestibular reaction.

Dr. George F. Suker had under observation at the present time a case in which there was paralysis of the sixth nerve with nystagmus. The man was loquacious and grandiloquent, but other than that had made a complete recovery. It was contrary to his nature to be loquacious, and he would like to know whether this mental condition was now and then found.

Dr. Robert Von Der Heydt men-

tioned a rather unusual case he saw during the existing epidemic at the Robert Burns Hospital, which terminated fatally. In addition to a lethargic state, the man had ptosis. He remembered distinctly he had to hold up the lids to see the fundus, and in the fundus he found hemorrhagic retinitis three days before death.

Dr. Alfred N. Murray personally had seen two cases of encephalitis lethargica recently; one of the acute form with ophthalmoplegia interna and paresis of the ocular muscles. In this case he could obtain spontaneous nystagmus, both vertical and lateral. The man had paralysis of accommodation amounting to 2 D. He was so sleepy that one might think he was under the influence of an opiate. He had not seen the patient recently, so that he did not know what his present condition was.

The other one, after having recovered from the acute condition showed an exudate about the discs indicative of a preceding papillitis; and he had paralysis of accommodation in one eye amounting to 2 D. He saw him five months after his first visit and paralysis of accommodation of 2 D. was still present. He was recovering, but was still rather sleepy in his demeanor.

Dr. Hall said that Dr. Suker had called attention to an interesting point. Certain mental conditions might occur after apparent recovery in these cases.

A Preliminary Anatomic Study of Six Cases of Degeneration of the Cornea.

Dr. Charles Maghy reviewed the literature and stated that degeneration of the cornea was first described by Beselin as amyloid, in an eye that was staphylocomatous. He found in the superficial layers of the scar of the cornea peculiar, highly refractive, organic masses of various shapes, not unlike those pictures which Goldzieher, Saemisch, Wedl and Bock described as colloid of the cornea, which however, with a 2 per cent iodine solution gave the typical amyloid reaction. Beselin was of the opinion that the refractile masses were in no way related to the cells of the epithelial layer

and when found in this situation had invaded the same from the stroma corneae below. He reported 6 cases in all of which one saw connective tissue upon and calcification of Bowman's membrane at the same time, so he could not decide which was the primary. As to the causes of the calcareous degeneration, he enumerated:

1. Nutritive disturbances or diminished interchanges of material and senile alteration of the blood vessels (primary band opacity).
2. Evaporation and external irritation in the region of the lid fissure. From the occurrence at the same time of calcification in the posterior parts of the eye it was evident that the cause of the calcareous degeneration of the cornea was not only local in origin, as other authors said. The lime came from the nutritive fluid.

The homogeneous mass in his sixth case resembled very closely in shape and situation those found by Beselin, Saemisch, Goldzieher and Birch-Hirschfeld. Beselin regarded it as amyloid, because he obtained the iodine reaction, altho not markedly as was usual in the case of true amyloid. Saemisch and Goldzieher regarded it as colloid. They did not describe the color reactions. Birch-Hirschfeld obtained no iodine reaction, and regarded it as hyalin transformed from the blood proteids. Under the term colloid this author included glue-like masses produced by metamorphosis of the cell elements themselves. On the other hand, hyalin and amyloid generally were considered as formed outside the cells, altho lately it had been suggested by a few authors that amyloid arose from plasma cells. Baquis considered the color reaction for amyloid incomplete and regarded the mass in his case as colloid, notwithstanding the fact that it showed this color reaction. These varieties of degeneration came from the following circumstances:

1. The iodine reaction for amyloid was not present in the majority of the cases.

2. Differentiation of hyalin and colloid material was impossible both physically and chemically.

According to his ideas he should regard as amyloid those masses which showed more or less iodine reaction; it was conceivable that one body became transformed into another, and that thereby various phases appeared which stained incompletely by the given staining reaction. On the other hand, he should distinguish colloid and hyalin genetically. Most pathologists did this, altho their methods of differentiation varied. As Birch-Hirschfeld and other authors said, he accepted the possibility of the transformation of hyalin to amyloid and he regarded that in Beselin's case the hyalin was already changed into amyloid. In the author's cases the masses in the epithelium were always *intercellular*, not *intracellular*, contrary to the opinion of Baquis, and he did not regard it as a secretion from the epithelial cells. Also so far as the substantia propria and corneal lamellae were concerned, it was not in them, but between the fibers. This was also contrary to Beselin's view.

DISCUSSION.—Dr. E. V. L. Brown said that he was struck by the disposition of the hyalin in or along the course of the new formed vessels in the limbus placed both deep and superficially, yet he would hesitate to draw any deduction as to the origin of the hyalin from this alone.

Dr. Maghy was unable to come to a conclusion as to whether or not the pannus tissue was first formed in front of or behind Bowman's membrane. Serial sections would undoubtedly have helped in this matter.

Dr. Robert von der Heydt mentioned some of the newer methods for investigating the structures of the anterior eyeball.

Many of the changes observed in this manner in the living eye would escape detection by the ordinary method of examining stained sections.

Dr. Maghy, in closing, stated that in cases of band opacity of the cornea in which blood pigment was found, the question of whether this pigment was primary or secondary was of vast importance. If the pigment was de-

posited secondarily following glaucoma, why was it we did not see it more often in cases of secondary glaucoma? If it was a primary process, we ought to see it more frequently in cases where we had had hypopyon ulcer, with extensive scar formation and tension. We ought to see it in penetrating injuries in which the iris had been drawn into the wound.

Probable Melanotic Sarcoma at the Sclero-Corneal Junction.

DR. WILLIAM H. WILDER presented a patient, a woman 38 years of age with a tumor, probably malignant, in the sclero-corneal region of the left eye. The patient otherwise healthy, had had a discolored, brownish area in the ciliary region of the temporal side of the left eye since childhood. This was supposed to be a birthmark. The appearance of it did not change until four years ago when it seemed to enlarge and become thicker and to gradually extend toward the limbus. In the last year it had been more active and more vascular and was now seen as an irregularly shaped flat growth about 1 cm. in its longest diameter and possibly $1\frac{1}{2}$ mm. thick in the temporal ciliary region of the left eye. The growth was pigmented in places and had extended onto the corneal limbus for about $1\frac{1}{2}$ mm. in the form of a dirty grayish membrane.

It was impossible to say whether it had infiltrated the sclera. There was no pain, the vision of the eye was 20/30 and nothing abnormal could be seen with the ophthalmoscope or by transillumination. It had the appearance of a melanotic sarcoma altho one must remember that epitheliomas in this region might sometimes be pigmented.

After carefully presenting the dangers of the case to the patient it was decided to try the effect of radium before resorting to enucleation of an otherwise normal eye. So far nine treatments had been given.

Crania-Tabes.

Dr. George F. Suker presented the following case: Young man with optic

atrophy, bilateral, in whom 20/20 vision, each eye, with uniform concentric contraction of fields to about 15° had been maintained since 1916 by the intraventricular injection of bichlorid of mercury into the anterior horn of the right lateral ventricle. In all he received six injections varying from 1/100 grain to 1/25. The mercury was added to about one-half of the intraventricular fluid withdrawn and reinjected into the ventricle. Systemic and antisiphilitic treatment was also given.

Acromegaly.

Dr. Suker also presented a young man with positive evidences of acromegaly, in whom there was a concentric contraction of each visual field with but a semblance of bitemporal hemianopsia. Each disc showed a minimum amount of swelling (papilledema) on the nasal side. The sella turcica was rather large and showed evidences of a neighborhood involvement as well.

Persistent Hyaloid Artery and a Fusiform Aneurysm of the Superior Temporal Artery in Same Eye.

In this case, of a young man, presented by Dr. Suker, there were three distinct branches from the main trunk of the remains of a hyaloid artery. The three branches were free and motile while the trunk was fixed. The three branches were on the temporal side of the disc. The main trunk was about 5 mm. in length and their branches varied from 3 to 5 mm. in length. The superior temporal artery showed a fusiform dilation of about 5 mm. in length; vision was normal, and no other anomalies present.

Optic Neuritis (Wood Alcohol).

DR. G. F. SUKER presented a young man, who with three others enjoyed a methyl alcohol debauch. The other three died. When the young man was brought to hospital, he had vision in each eye, limited to hand movements. Spinal fluid and blood Wassermann negative and yet salvarsan, given in intensive doses and at relatively short

intervals, restored vision in each eye to 20/30. When able to take visual fields, no positive central color scotoma was obtainable, but only a central relative scotoma for color and form, for about 15° was obtained. The discs, six weeks after debauch, did not show any distinct evidence of atrophy, tho there was a moderate temporal pallor present in each. Whether or not the salvarsan injections had any direct effect in producing this rather good end result was not fully determined. And, still one could not altogether deny the influence of the arsenic in salvarsan upon the so-called retrobulbar optit neuritis. Free elimination with sweatings were the only other measures employed.

FRANCIS LANE,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY

February 21, 1920.

Dr. E. E. McKeown presiding.

Glaucoma Simplex.

H. R. STILWILL, Denver, presented a negro aged 40 years, the vision of whose right eye had been failing for three years, and entirely lost for the past five months. The patient had come on February 16, 1920, complaining of a growth on the right eye which he thought to be a cataract, but which was merely a conjunctival thickening to the nasal side of the cornea. He had seen halos, but there had been no pain or redness in the eye. The eye was divergent. The pupil measured 3 mm. in diameter, and did not react directly to light, but did consensually. There was no light perception in this eye. The tension was normal, the cornea clear and not anesthetic. The anterior chamber was not shallow. The entire optic disc was depressed about 2 mm. (7 D.), and a rather large vein was seen on the floor of the excavation. The disc margin was not undermined. The left eye was normal.

DISCUSSION.—Edward Jackson, Denver. In the absence of increased tension in the eye, and in view of the ap-

pearance of the disc, which has not deeply overhanging edges, it seems likely that the atrophy is not due to pressure, but to a cavernous degeneration in the head of the optic nerve. There is apparently a distinct class of cases with degenerative changes in the nerve head, but without increased tension. In these cases also there would be absence of pain and other glaucomatous disturbances.

Ossification of the Choroid.

H. R. STILWILL, Denver, exhibited a specimen of bony formation which had been found surrounding the optic disc in an atrophic eyeball. The specimen measured roughly 10 by 12 mm., and the opening corresponding to the optic nerve was distinctly to one side of the center. The patient who was 33 years of age had received twenty-four years previously an injury to this eye from the explosion of a dynamite cap; and the eye was now removed on account of chronic irritation.

Exophthalmus and Failing Vision; Doubtful Etiology.

D. H. COOVER, Denver, presented a woman aged 35 years in whom for two years there had been exophthalmus and failing vision, the cause of which had not been discovered. The trouble had begun in the right eye, the vision of which was now reduced to light perception. There was a very marked proptosis from the beginning, but never vomiting or much headache. After cleaning out of the right ethmoid, the proptosis partly receded, and the vision improved, but the improvement in each respect lasted only a few weeks. Some months later temporary improvement was again obtained in the same way. In November, 1919, the vision of the left eye began to fail, and at the time of report it was reduced to 3/60. The central field of this eye was gone, and peripheral vision was retained only in the temporal field. Pressure on the right eye produced marked pain in the orbit. The movements of the right eye were limited upward and inward. The pupil of this eye did not react either directly or consensually. There was supraorbital

neuralgia, and sometimes the pain was reflected behind the ear and to the roof of the mouth. Exenteration of the ethmoids and opening of the sphenoids on both sides in January, 1920, again produced slight temporary improvement. A small amount of pus was at that time and at earlier operations found in the right ethmoid. The right disc was slightly pale and the arteries of this eye were a trifle narrow. There was no change in the left disc. The tonsils had been removed, and dead teeth extracted. Wassermann test and urine were negative.

DISCUSSION.—Melville Black, Denver, had seen the patient in December, 1919, at which time the vision in the left eye was 20/200, and the right the same as at present. At that time he advised removal of the dead teeth and the tonsils, and the use of eliminative treatment. The cause of the visual disturbance was probably retrobulbar neuritis, depending on a focal infection somewhere. The condition seemed to have a vascular relationship, because the proptosis was aggravated when the patient leaned over toward the affected side.

W. A. Sedwick, Denver, had reported a similar case before the society four years previously, the woman having a proptosis which was increased when she leaned toward the affected side. In that case a dentist pronounced the teeth negative. After a long vacation, the condition was very much relieved, but shortly after she started work again the symptoms returned. The nasal sinuses were found negative. Another dentist pulled a diseased tooth, and the patient had remained perfectly well since. Dr. Sedwick believed that there was still a possibility that a diseased tooth was responsible in Dr. Coover's case.

Postoperative Streptococcic Infection, Cured by Diphtheria Antitoxin.

D. H. COOVER, Denver, presented a man aged 59 years who two days after a straightforward cataract operation developed a severe streptococcic infection involving the area of the incision. The evening of the operation he had a

sneezing spell which caused him considerable pain, but the next day he was comfortable. The second night he had a severe attack of pain which lasted for several hours. Next morning, on removal of the bandage, the incision was found covered with an exudate which invaded one-third of the cornea. The anterior chamber contained some blood and strings of exudate, and the bulbar conjunctiva was very red. The following morning the general reaction was very severe, including chemosis of the conjunctiva. Without waiting for the result of a culture (which was subsequently reported to be streptococcic), the patient was given 5,000 units of antidiphtheritic serum, in addition to the treatment already employed, namely atropin, bichlorid of mercury ointment, and hot fomentations. Fifteen hours after the injection of the serum, the eye was a great deal better, and in twenty-four hours after the injection the cornea had regained most of its luster and the infection seemed to be arrested. Forty-eight hours after the first 5,000 units, the patient was given another 1,000 units which seemed to have no further effect on the exudate. In view of the rapidity with which the beginning panophthalmitis was arrested, Dr. Coover believed that he might have saved the vision if he had given the serum when the infection was first observed. It was possible that the exudate might still become absorbed.

DISCUSSION.—Melville Black, Denver, doubted whether the eye would ever be of any value, altho if it became perfectly quiet operative procedure might give a slight amount of vision.

Edward Jackson, Denver. The specific action of the serum in these cases depends upon the proteid content of the serum, which produces immune bodies in the patient. Sterilized milk is being used for the same purpose. Recent animal experiments by an American ophthalmic surgeon seem to indicate that injection of sterilized milk has a beneficial influence on inflammations of the eye.

H. R. Stilwill, Denver, who had seen the eye a number of times, said that in the beginning it looked a typical picture of panophthalmitis. The rapidity of improvement was striking from day to day.

W. C. Finnoff, Denver, pointed out that it was not the number of antitoxic units injected but the quantity of serum employed that determined the production of immunity.

Amblyopia of Pregnancy.

C. O. EIGLER, Denver, presented a woman aged 24 years who had become completely blind at eight and a half months of her first pregnancy. There had been swelling of the legs, hands and other parts of the body from the seventh month. Two convulsions occurred before Caesarian section, which was done on October 30, 1919, three days after the onset of blindness. The vision steadily improved. On December 11 it was R. 5/30, L. 5/60, and on January 8, 1920, R. 5/15, L. 5/30. There had been a good deal of hemorrhagic exudate, which had gradually disappeared. At the time of report there were no hemorrhagic areas in the fundus, but there were white streaks between the disc and the macula of the right eye.

DISCUSSION.—Melville Black, Denver. The optic nerve is white and the vision poor. She evidently had an albuminuric neuroretinitis. There are some permanent changes in the eye grounds.

Retinal Tuberculosis.

W. C. FINNOFF, Denver, presented a woman aged 33 years whose ocular changes had included blurring of vision of the right eye, slight vitreous haze on the temporal side, and in the macular region a flat white exudate and a finely granular hemorrhage into the retina about one and three-quarter disc diameters across. When these conditions were noticed at the first consultation on October 16, 1919, the vision was R. 0.8, L. 1.2. The lower temporal vein was distended. To the extreme temporal side of the fundus an area of white exudate covering one of the peripheral branches of the lower

temporal vein could be seen thru the vitreous haze. The lower portion of this exudate was bordered by a narrow hemorrhage, and another similar exudate was seen just above the first one, covering one of the terminal branches of the upper temporal vein. The vitreous had remained hazy on the temporal side of the disc until the time of report. On December 6, 1919, an oval patch of yellowish exudate was noted on the optic nerve in the region of the physiologic cup. This was later replaced by a small band of retinitis proliferans which extended on the temporal side to the inner border of the macula. No distinct change had occurred in the left eye. The patient had always been perfectly well. Urine and Wassermann tests were negative, as also were examinations of the nose and tonsils. There were several unfilled root canals, but no evidence of apical abscesses or granulomas around the roots of the teeth. The case had been treated with small doses of tuberculin.

DISCUSSION.—E. R. Neep, Colorado Springs, suggested that it was advisable to give a large dose of tuberculin to determine the presence or absence of a tuberculosis reaction.

Melville Black, Denver, advised the beginning of tuberculin in therapeutic doses, but also believed that there was a possibility of focal infection from the teeth, and thought that the most suspicious tooth should be extracted and cultured to determine whether the streptococcus viridans was present or not. If it were, all the teeth whose root canals were not filled should be removed.

Dr. Finnoff replied that the simple finding of streptococcus viridans would not give valuable information; but that it would be necessary to culture the bacteria by the technic of Rosenow to determine the proper oxygen tension under which they would grow. Then if growth occurred, the bacteria should be injected into animals, and if the corresponding disease was produced experimentally in the animal, this could be regarded as demonstration of a like etiology in the patient.

Venous Aneurism in Retinal Arteriosclerosis.

W. C. FINNOFF, Denver, presented a man aged 70 years whose vision had been good until five months previously, when he had got up one morning unable to see out of either eye. Vision had gradually improved, and at the time of report was R. 5/60, L. fingers at one foot. There had never been any pain in the eyes. There were slight lenticular opacities in each eye, and marked arteriosclerotic changes in the vessels of the fundi, including new-formed vessels over both discs, three apparently venous aneurisms along the upper temporal vein of the left eye, between two of which ran small vessels probably representing collateral circulation.

Eye Injury from Explosion.

W. C. BANE, Denver, presented a boy aged 12 years whose right eye had received perforating injuries thru the cornea and sclera from the explosion of a .22 caliber rifle. The vision of the eye was reduced to light perception. Displacement of the iris inward, in the lower nasal quadrant, gave the appearance of an iridectomy. The lens was cloudy. One fragment of glass had been removed from the

cornea, and another piece had come out spontaneously.

Arteriosclerotic Changes in Retina.

W. C. BANE, Denver, presented a man aged 56 years, who had come complaining that for the past two years the vision of the left eye had been failing. The vision was R. 5/15, L. 5/60 part. He stated that with the left eye he could only see the left half of anything he looked at. The right fundus was normal and the vessels good. In the left fundus the disc could not be seen, being concealed by a web of newly formed, bright red vessels, which anastomosed freely, and extended upward from above the center of the disc for two disc diameters, having about the same extent laterally. In the upper central portion of the fundus were three vertical flame-shaped hemorrhages. The inferior temporal vein curved sharply twice about two disc diameters below the center of the fundus and then projected forward into the vitreous like remains of the hyaloid artery. The urine showed sugar, albumin, and hyalin and granular casts.

WM. H. CRISP,
Secretary.

ABSTRACTS

Gallemaerts, E. and Kleefeld, G.
Microscopic Study of the Living Eye, The Cornea. *Ann. d'Ocul.*, 1919, v. 156, p. 641, v. 157, p. 89.

The authors describe the method of examining the eye by means of the corneal microscope of Czapski and the Gullstrand Nernst slit lamp. These instruments are illustrated, as is the method of their use. Three forms of illumination are used; (1) direct, upon the spot to be examined; (2) indirect, where the light is direct upon an area near the spot to be examined; (3) reflection from a deeper surface, the objects in front appearing in black.

Their second article describes the normal and pathologic cornea under 15

heads, with additional matter to appear in a subsequent paper. Twelve very interesting illustrations, six of which are colored, accompany the present article.

(1) CORNEA. — Arachnoidean corpuscles are found thruout the parenchyma, but no connection can be established between their prolongations. Descemet's membrane seems a homogeneous layer. At the corneoscleral junctions, processes pass from the sclera into the cornea, frequently accompanied by a blood vessel. The nerves lose their myelin sheath at the limbus, and pass centrally, terminating immediately below the corneal surface. It is necessary to oscillate the

illuminating apparatus in order to follow them, as their visibility varies. In old people, the epithelium seems somewhat granular in the periphery, and the whole cornea is more opaque. The corpuscles, however, are more distinct. The arcus senilis is due to the presence of numerous granules at different levels. Often, ruptures of the epithelium and slight depressions are seen.

(2) **KERATITIS IN GENERAL.**—(a) *Edema of the cornea.* Of this there are two varieties, one due to inflammation, the other to uveal conditions. In the former, the corpuscles become more distinct. Often the whole cornea becomes so opaque that nothing can be seen. In the latter, there are vesicles which may be caused simply by circulatory disturbances in the anterior segment of the uvea. They are of variable sizes, circular or polygonal, transparent, often only microscopically separated from each other.

(b) *Striae.*—These are found in a large number of uveal affections, on the posterior surface of the cornea, running in different directions. They are also present after any operation evacuating the aqueous, and are perpendicular to the section of the cornea. There are also pseudostriae, which lie very deep, have nothing to do with hypertension, but are rather alterations in the parenchyma corresponding to uveal inflammation.

(c) *Vascularization.*—Normally, vascularization stops at the limbus, but not in a manner as schematic as hitherto described. The vessels terminate in a double festooned collarette, one lying deeper than the other, which give rise to vascular branches radiately directed, in varying numbers, towards the center of the cornea. These branches are difficult to distinguish, since they may be confused with other structures present, viz., the terminations of the scleral lamellae, radiating lymphatics and limbal blood vessels. Often about 1 millimeter beyond the limbus are found radial, unbranching capillaries in the deep tissues of the normal cornea. In the pathologic conditions, there is an intensification of the above structures, with new formation of blood vessels in the inflamed area.

This intensification is divisible into 3 classes, (1) superficial, (2) mediate, (3) deep, each presenting special characteristics. (1) Superficial, vascular bundles are found on the cornea, or in it at various levels. They branch irregularly, and become more plexiform the more the condition, such as pannus, ulcer, etc., is accentuated. In the beginning the vessels are mere cords, containing no blood, nor could it be determined how vascular permeability was produced. These cords develop into loops, the neighboring ones anastomosing, but how this takes place could not be determined. Sometimes the process takes the form of a horseshoe with the convexity towards the center of the cornea. Even after the inflammation is cured, some vessels still remain. The blood column becomes irregular and capillaries develop which enclosed the blood vessels. In old wounds there is found a comet shaped, ochre-brown colored granular mass, which is the last stage in the transformation of the red cells.

(2) Mediate. This is initiated by pointed cords developing from the pericorneal loops, which contain no blood at first. Amastomoses develop in such a way that an irregular quadrilateral area is formed.

(3) Deep. This arises as the result of vascularization of an old exudate in the irido-corneal angle. From the root of the iris arises a wavy vessel which rapidly penetrates into the cornea in a very deep zone. It takes a sinuous course, giving off numerous tortuous branches. In the case of traumatism such a vascularization indicates phthisis bulbi.

(d) *Deposits* on the posterior surface of the cornea are (1) cellular and (2) noncellular.

(1) Cellular.—(a) White globules. These are grey or white homogeneous points, sharply defined, which are isolated or confluent. They are especially abundant on the lower part of the cornea, and also are found in the aqueous. They precede iritis.

(b) Sanguineous. These are best seen with direct light. They are found in the beginning of the inflammation as brick red, roundish disks, isolated, or as com-

compact masses in the anterior chamber, but may be hidden by fibrous deposits. They are found in trauma, syphilitic or tubercular iridocyclitis.

(c) Pigment. These are of brownish red color, due to the presence of pigment cells, are isolated or may be massed in deposits of considerable size, and are sprinkled with pigment cells and granules. They may be found on the lens.

(2) Noncellular. These are present in the form of fine irregular, and often crystalline detritus containing pigment, and sometimes cholesterol.

(a) Droplets. These give to the posterior surface of the cornea the appearance of glass covered with vapor, and are best seen by indirect light. They are of the same size and never superimposed, as leucocytes are, and are larger and clearer than leucocytes. They are found at the beginning of the inflammation and are probably due to changes in the endothelium.

(b) Fibrillae. These look like strands of cotton and are found in syphilitic and tubercular iritis and in parenchymatous keratitis.

(c) Stars. These are formed by collections of (b).

(d) Granules. These are formed by condensation of filaments, and contain leucocytes and pigment cells. They form nodules of various sizes. One form is characteristic of tubercular iritis, and is a greyish, fatty looking area formed by concentric strata of different ages, thickest in the middle, and never pigmented.

(e) Powder. This is a delicate, greyish, ill defined area, the granules of the same size, developing around foreign bodies. These various deposits are found associated in varying degrees and their numbers have no relation to the disease.

(3) ACTION OF DRUGS ON THE CORNEA. (a) Cocain. About 15 minutes after the instillation, the entire thickness of the cornea is invaded by opacities in the form of points or even spots, of a greyish or light yellow color, sometimes circular, sometimes irregular, of varying sizes, involving especially the middle and posterior portions of the cornea. It is a phenomenon of inhibi-

tion, affecting chiefly the intercellular substance.

(b) Holocain. This causes opacification involving chiefly the arachnoidean substance. Following the use of the tonometer, distinct, concentric striae appear in the epithelium at the place of application, which persist for some time.

(4) CORNEAL ULCERS. The lesions are practically those found by pathologico-anatomic examination.

(5) EPITHELIAL DYSTROPHY. The appearance is similar to edema of the cornea. There are epithelial prominences similar to herpes corneae, which rupture and assume varied appearances. The cornea does not show infiltration. It is usually the first stage of the following condition.

(6) LYMPHATIC KERATO-CONJUNCTIVITIS or PHLYCTENULOSIS. The nodules are transparent and homogeneous. Around this is an area of infiltration of the entire thickness of the cornea, consisting of small white spots. The cornea is never involved beyond this area.

(7) HERPES CORNEA.—There are three stages:

(a) Invasion. The lesion is one of the substantia propria with secondary involvement of the endothelium. There is extreme congestion of the iris and edema of the cornea. Vesicles of varying size and of a general polygonal shape are found, surrounded by an area of extremely severe edema formed of an interrupted succession of small grey to white points, which radiate into healthy tissue. At the site of the ulcer, there is a slight recession below the surface of the cornea, and an amorphous exudate thru which the corneal tissue seems greyish and sprinkled with points, which give a darker appearance than the surrounding cornea. The epithelium rolls upon itself but presents no changes, while the margins of the ulcer present a series of rectangular segments. The endothelium is greatly altered. There are false striations of the posterior surface of the cornea, with regular fissures running in every direction, their number being independent of the epithelial lesions. The process is a trophic one, the improperly nourished epithelium and endothelium dying and being cast

off, permitting inhibition of the lamellae.

(b) Active stage. This exhibits new vesicles and ulcerations with exaggerations of previous lesions. This congestion increases and deep vessels invade the marginal zones of the cornea while superficial invasion takes place in every direction.

(c) Stage of repair. The edema and striae suddenly disappear, the cornea being entirely transparent except in the ulcerated area, where the epithelium gradually covers it, leaving a typical scar.

(8) SUPERFICIAL PUNCTATE KERATITIS. In this condition the epithelium is elevated by opacities, becomes ruptured and gives rise to microscopic ulcers.

(9) VERNAL CONJUNCTIVITIS. With low magnification a vitreous mass is seen at the limbus, in a wavy line with numerous elevations, all independent of the corneal tissue, and separated by a transparent zone from a greyish zone. This mass under magnification shows, at its external border, turgescient conjunctival and episcleral vessels; which ramify in two different ways. Some run parallel to the surface; others run perpendicularly and terminate in an ampullary dilation—the blood spots of certain authors. At the internal border is a succession of extremely large vascular arcades. By moving the arm of the lamp a vitreous condensation can be seen around the vessels. Some of the arcades give off capillaries, some of which contain no blood.

(10) PARENCHYMATOUS KERATITIS.

(a) Stage of edema. This lasts 8 to 15 days. There is an increase in the vascularization at the limbus. The edema involves the entire parenchyma and sometimes develops in a half a day.

(b) Stage of activity. This gradually develops and lasts a variable time. Very small capillaries develop in all layers, followed by disappearance of the edema near them and appearance of it in nonvascularized areas. In different layers appear small greyish

areas, ill defined, elongated, parallel to the surface. The arachnoidean corpuscles are not altered. The invading vessels are surrounded by a greyish sheath, clearly demarked from the corneal tissue nearby. This probably gives rise to the opacification of the cornea.

(c) Stage of clarification. This lasts the rest of the patient's life. It commences in certain areas while others are still in the stage of activity. It arises away from the vessels and especially in the superficial layers. By indirect illumination, a large number of vessels are seen, some empty, some containing blood. The tissue between the vessels is translucent. By oscillating the lamp, small nebulae are seen at different intervals. In the deeper layers, however, the opacities form a homogeneous area, limited by a delicate white aura. Recurrences present small, greyish, sharply marked areas, which are vascularized secondarily by long, superficial vessels, which do not branch before reaching the inflammatory foci. The preliminary edema is not present in recurrences.

(11) CORNEAL SCLEROSES. (a) Sclerosing keratitis. The corneal tissue is whitish, and sprinkled with small white spots in every layer. Neither corpuscles nor intercellular substance can be seen. Blood vessels of the deep type are usually present. The tissue, while less transparent than corneal, is much more so than scleral. Blood vessels can be distinguished but not the lymphatics or corneal nerves.

(b) Corneal degeneration. Frequently a deforming pannus is present.

(c) Grill-like keratitis. Sometimes the tissue is opaque, sometimes transparent, even more than the normal cornea. The clear zones are separated by fibres which are resolved by the microscope into white points or plaques.

(d) Leucoma adherens. The superficial layers of the white area lie above a tissue as opaque as the sclera. It is surrounded by a zone infiltrated with white granules. The iris is reduced to a delicate film composed for the most part of centrifugal fibers. In the

pigmented variety brown granules are found below the epithelium.

(e) Band keratitis or lagophthalmia. The appearances are numerous, but all are characterized by irregularity of the corneal surface due to loss of substance. A new variety, called by the authors "dégénérescence cireuse," consisted of a whitish, amorphous, translucent zone, corresponding to the palpebral orifice, limited by epithelium rolled up like parchment.

(f) Disciform opacity of the cornea. There are a large number of small points in the epithelium. No edema of cornea, but opacification usually finely punctated, without corpuscles, is present, limited by a slightly irregularly curved line, concentric with the limbus. No vascularization and no intracorneal hemorrhage.

(g) Keratitis disciformis. There are four concentric circles formed of small greyish points arranged radially, beginning subepithelial but involving the whole corneal tissue. The circles were separated by transparent zones, less infiltrated.

(h) Gerontoxon. The alteration of the cornea is due to an infiltration of small whitish points, found in every layer of the cornea. The epithelium may show lacunae and the nerves are well seen.

(12) TRAUMATIC KERATALGIA. There is a fissure in the epithelium, probably extending to Bowman's membrane. Next to this is a transparent zone limited by a greyish border. Under the epithelium is a large number of microscopic vesicles, the site of detachment of the epithelium. The substantia propria shows no changes.

(13) COMMOTIO OCULI. The cornea is transparent. There are radial striae on the posterior surface, due to rupture of the epithelium, containing red blood cells and simulating blood vessels. Between them the blood cells are irregularly disposed. When the traumatizing body directly affects the cornea, lesions of the latter are present.

(14) SIDEROSIS. (a) Local. Following presence of foreign body, there is a very narrow opalescent area around it, with small greyish spots. Necrotic

tissue, clearly marked off from the healthy, is found consisting of a greyish white, vitreous, irregular mass, filled with spots and fragments. The surrounding cornea is sprinkled with greyish spots, whose number diminishes away from the foreign body. In the deeper tissues, the corpuscles are more marked. There are cylindric structures running parallel to the corneal surface. Still deeper, but within the cornea are very fine greyish spots.

(b) Generalized. The corpuscles are very distinct, and are lightly yellowish-brown colored, the intermediate substance showing no changes.

(15) KERATOCONUS. It is almost impossible to focus the light. When an opacity is present, it shows nothing unusual. Old infiltrates in the tissue can be seen. At a certain distance from the apex, a circle of reddish-brown color, is faintly visible. Des-cemet's membrane is folded, sometimes radially, sometimes concentrically.

C. L.

Snell, Albert C. Compensation for Ocular Injuries. [New York State Journal of Medicine, July, 1919, p. 277.]

The object of the paper is to suggest a method by which compensation for ocular injury may be computed accurately and scientifically. Since the law definitely fixes the rate of compensation for total loss of vision in one eye or both, the opinion of an ophthalmologist is necessary only when there is partial loss of vision. In order to determine such percentage of vision remaining, only a scientific standard of measurement should be used.

Normal vision comprises, essentially, three easily separable functions: The first is that of detail perception, commonly called visual acuity; the second allocation or peripheral vision; and the third is binocular vision. The first two elements of vision are mutually dependent, altho they may functionate separately, and since they are mutually dependent are of equal value. Binocular function is determined by the relative loss of efficiency to the workman whose occupation requires a

good sense of distance and depth; and the great weight of authoritative opinion and experience fixes the value of binocular vision at 20%. Therefore, if central vision "C" is placed at 100, field vision or "F" would be 100 also, being of equal value, and consequently "B" the unit of binocular vision (being 20% of the whole) would be 50; hence $C+F+B=250$ total.

Each essential factor of vision is reckoned on an accurate percentage basis so that any partial loss of one or more of these elements may be determined. Central vision is measured with the Snellen standard, and the result expressed in a decimal, such as $20/30=.66$. When the disability involves both eyes the central visual acuity for each eye should be measured separately.

The field of vision can be determined in any of the accepted ways. For defining the limits of the field appropriately-sized objects should be used (20 mm.); whilst for the determination of the more central areas, smaller test objects should be employed (3 to 5 mm.). Any defect of the field, scotomata both relative and complete, should be measured and charted. Field vision is expressed in a decimal and is determined in the following way. The normal field of vision extends from the point of fixation upward 60°, nasalward 60°, downward 70°, and templeward 90°; the entire field has a radial width of 70°. Therefore the radial width of any part of the field remaining after partial loss, or its equivalent in concentric area, is the numerator, and 70 is the denominator. Thus the percentage loss in a field which has a contraction of 20° equals $20/70$ or 0.285.

In determining the measurement of the binocular factor we are guided by certain facts. The following conditions being present there is a total loss of binocular function: First, when eyes constantly squint whether convergent, divergent or vertically separated. Second, when a difference of 0.70 or more exists between the visual acuity of the two eyes (visual acuity to be determined with the use of proper correcting glasses). Three, when the

vision in one eye is less than 0.1. Binocular vision and good depth perception may be assumed to be present, when the refraction is equal in both eyes and when there is no squint, provided the vision of one eye is 1/10 or more. "With the unilateral reduction of the visual acuity to not less than 1/6 ($20/120$) in one eye, good binocular vision may be assumed without special testing."

By the use of data thus obtained, which give measurement of value for each of these three elements of vision following any partial loss to one or more of these elements, the exact proportion of the vision which remains after ocular injury may be accurately computed. Example: A small central corneal scar with visual acuity $20/40$ or .50, without disturbance of the field and with but loss of binocular function: $C=.50$, $F=100.$, $B\ 50$, a total of $200\div250=.80$, the amount of vision remaining. The amount of vision lost in this example must then be 20%.

C. H. M. and W. B. D

Bonnefon, G. The Yperized Eye.

Ann. d'Occul., 1919, v. 156, p. 577.

Under this title, the author describes his experience with eyes which had been affected by *dichlorethyl sulphat*. He distinguishes 3 periods: (1) The initial or irritative, (2) period of retention, (3) terminal.

(1) This stage may be delayed several hours. There is hyperemia of the conjunctiva, less pronounced than in the case of chlorin gas, and the pain present is less severe. There is a clonic contraction of the orbicularis. The patient walks with his hands covering his eyes. The cornea is *never* involved.

(2) This stage develops over night. The patient awakens blinded, owing to edema and infiltration of the lid and conjunctiva and the exudate from all the glands of the lid and cul de sac. The lids are glued together by the exudate upon the margins of the lid, which rapidly dries and mats the cilia together. The culs de sac are distended with fluid, and the ball is bathed in a mixture of tears, exudate and debris.

The picture is exactly that of a purulent conjunctivitis in the edematous stage. On attempting to force the lids apart, a yellow fluid spurts from between them, followed by a cry of pain from the patient and the forcible contraction of the orbicularis. Opened by gentle means, the cornea is seen to be intact.

Drawing the lids away from the ball, the conjunctiva of the latter is seen to be of a wine red color, with a distinct line of demarcation where the margins of the lids touch the ball, more pronounced below than above. This injection gradually fades away inferiorly so that the horizontal meridian seems to be outlined by two bands of anemic conjunctiva. These bands diminish rapidly in size, terminating long before reaching the canthi. The culs de sac are intensely injected and edematous. This edema may extend on toward the reddened area of the bulbar conjunctiva, along the palpebral orifice, so that a chemotic area is inserted sometimes between the lids and becomes caught.

(3) After 24 hours of compresses and lavage, with careful toilet of the cilia, the eye is greatly improved, only the hyperemia, lachrimation, and photophobia persisting, until in a week the patient is convalescent. In severe cases, however, the symptoms persist, and the photophobia and lachrimation are accentuated. The meibomian glands secrete to such an extent that the margins of the lids appear to be covered with zinc oxid ointment. Hordeola and chalazia appear, the latter having a marked tendency to suppurate. These conditions, especially the photophobia and lachrimation may last weeks.

Corneal involvement in man never takes the form of a burn, but always of a keratitis, and is due to microbic invasion during the second stage, when the retained fluid causes maceration of the corneal epithelium. Another cause is the anesthesia of the cornea caused by instillation of cocain, according to official orders. Corneal involvements take the form of (A) simple ulcer, (B) circumscribed abscess of the cornea, (C) hypopyon

keratitis, (D) pneumococcic serpigenous ulcer.

In only one case in 30,000 was there hypertension.

TREATMENT. First stage—liberal and frequent lavage. Hot compresses for the pain. Second stage—frequent lavage to remove retained fluid and cleansing of the cilia. Avoidance of all collyria, especially cocain. Third stage—alkalin douches have no effect, and isotonic, and bicarbonat solutions seem to accentuate the irritation. Cocain and adrenalin are temporarily palliative. The best results were obtained by the author with a mixture of saturated aqueous solution of sodium sulphat 800 gr., syr. simple. 200 gr., with which the eyes were bathed for ten minutes, 2 to 4 times a day.

C. L.

Coblentz, W. W. Comparison of Photoelectric Cells and the Eye. American Journal of Physiologic Optics, vol. 1, p. 41.

The explanation of physiologic phenomena by chemical and physical reactions appears so plausible that it is needful to observe extreme caution in accepting such explanations. Coblentz considers the human eye as a radiometer, giving in graphic form the relative sensibility of the eye to light of different colors, the comparative sensibility curve of 125 observers, and the sensibility curves of four color blind subjects.

He also considers the photoelectric cell as a radiometer, including: variations of photoelectric current in molybdenite with time of exposure; the distribution of energy of a gas-filled tungsten lamp, measured at different points in the spectrum with the photoelectric cell and with the thermopile; and the photoelectric sensitivity of calcium, and rubidium compared with that of the average eye.

Coblentz finds that in the gas-ionic photoelectric cell the response of the negative electrode, when exposed to light, is vaguely analogous to that of the retina of the eye. But the spectrophotoelectric responses or sensitivity curve has its maximum, if any, in the

extreme violet where the eye is quite insensitive to radiation; and the shape of this sensitivity curve is only very vaguely similar to the sensibility curve of the eye. The possible "aftereffect" similar to the persistence of vision, which occurs after exposure, needs further and very careful investigation to make certain that there is such an effect.

Spectro-photoelectric sensitivity in solids, shows that like the eye, they are selective as to wave length and intensity. But the maximum response to radiation stimuli occurs usually in the extreme red, or even far out into the infrared; and there is no similarity to the visibility of radiation curve of the eye. Considered as a whole the phenomenon of spectro-photoelectric sensitivity in solids is only vaguely, if at all, similar to the visual response.

Combining the gas-ionic, spectro-photoelectric responses with that observed in solids does not give us a composite effect which is analogous to the selectivity of the eye (1) to the rate of response, or (2) to the intensity, and (3) to the wave-length of the exciting light. Neither does persistence of vision, color of after images, etc., which obtain in the eye, have a counter-part in photoelectric sensitivity.

"In the writer's opinion, evidence is not sufficient to conclude that there is a connection between the phenomena of color and brightness perception, and the phenomenon of photoelectric sensitivity of inanimate material."

E. J.

Guglianetti, Luigi: A New Synchiotome. *Archivio di Ottalmologia*, v. 26, 1919, p. 235.

The author describes a knife devised by him to separate irido-corneal synechia, especially where the lens capsule is involved, when these are too extensive for the use of Piccoli's smaller knife. It consists of a stem and blade set at an obtuse angle on the handle. The blade is slightly sickle shaped at the end, with both concave and convex edges sharpened for a distance of 10 mm. The stem is thin and of equal

width so as not to separate the lips of the corneal wound. It thus prevents the chamber from emptying. The blade is introduced opposite the synechia, and by turning it laterally a cut is first made with the convex edge. Should this not separate all the fibres, the blade is turned back, when the slightly hooked concave end will engage and cut the remaining fibres.

The blade is wider and stronger than a Graefe knife, and its double edge and shape would seem to give it some advantages in certain cases.

S. R. GIFFORD.

Bollack, J. Papillary Stasis and Dilatation of Ventricles in Cerebral Tumors. *Ann. d'Ocul.*, 1919, v. 156, p. 538.

The author reviews 27 cases of brain tumor from the above standpoint. Twenty-three cases were associated with choked disc, the location of the tumor being 7 cases the convexity of the brain, 14 cases the posterior region, and 2 cases the lateral ventricle. Four cases did not show this symptom, being located 1 on the convexity, 1 in the posterior region and 2 central. So far as dilatation of the ventricles is concerned, in 15 cases located in the posterior region, the third ventricle alone was dilated 6 times, in combination with the lateral ventricles 8 times, and neither once. In 8 cases located on the convexity, there were 4 cases of dilatation of the third, 1 of the lateral ventricle, and 3 of neither.

In 2 cases located in the ventricular region, there was 1 case of combined dilatation of the third and lateral ventricles, and 1 of the lateral alone. In 2 central tumors, there was 1 case of dilation of the lateral alone, and 1 of neither.

Accordingly, it is possible to say; that dilatation of the third ventricle is always accompanied by choked disc, and the converse is usually the case. Dilatation of one or both lateral ventricles is accompanied by choked disc only when the third ventricle is also dilated; and it is accompanied rarely by choked disc, when it alone is present. In 20 cases of choked disc, the

foramen of Monro was dilated unilaterally 3 times, bilaterally 12 times. This dilatation which was sometimes considerable, was always accompanied by dilatation of the third ventricle, and often by that of the lateral ventricles. The latter was always accompanied by dilatation of the foramen of Monro, but the former not necessarily. The aqueduct of Sylvius was altered in 16 cases out of 20 of choked disc. Sometimes it was obstructed by the tumor, sometimes flattened out by compression, but usually dilated.

Relation of the duration of the choked disc to the degree of dilatation of the ventricles was:

(1) Stasis 15 days to 3 months—5 times none, 3 times isolated dilatation of third, 1 of both lateral.

(2) 4 months to 1 year—3 times dilatation of the third ventricles and foramen of Monro.

(3) More than 1 year—a generalized dilatation was found in 4 cases out of 9.

There seems to be a sequence of dilatation, dependent on the duration and the intensity of the hypertension. This increase of tension is a physiologic condition due to disturbance in the equilibrium between the subarachnoidal and ventricular tension. This in turn may be due to increased production of the cerebro-spinal fluid, due to inflammation, or to interference with the absorption of the fluid, or to interference with its circulation. The clinical manifestations include the hypophyseal syndrome, radiographic findings, lumbar puncture findings, ventricular puncture.

The author briefly discusses the various theories concerning choked disc and then gives an embryologic, anatomic and histologic discussion of the relation between the third ventricle and the chiasm. He concludes from the clinical or anatomic demonstration of the constancy of ventricular hypertension, on the one hand; and from the intimate embryologic, histologic and anatomic relations between the third ventricle and the chiasm, and the direct influence of lesions of the former upon the latter, on the other hand; that ventricular dilatation plays a preponderant role in the production of choked disc.

C. L.

Bourgeois, A. Simple Procedure for Extraction of Traumatic Cataract. *La Clinique Ophtalmologique*, 1920; IX, 107.

He reviews his technic in this article and calls attention to his previous articles, one read before the French Ophthalmological Congress of 1909 and another in 1913. His present article was inspired by the excellent results obtained by Darier who is using the technic for the removal of the lens in high myopia.

The author's technic is a linear extraction, in which he uses a narrow keratome bent at an angle of about forty-five degrees. He utilizes four or five scoops of the Daviel type. As one fills up with the lens material he milks out a certain quantity, then another scoop is used. He does not perform an iridectomy and claims his results have been very gratifying.

T. J. DIMITRY.

American Journal of Ophthalmology

Series 3, Vol. 3, No. 7

July, 1920

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

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Proof should be corrected and returned within forty-eight hours to the printer. Reprints may be obtained from the printers, Tucker-Kenworthy Co., 501 S. La Salle St., Chicago, Ill., if ordered at the time proofs are returned.

Subscriptions, applications for single copies, communications with reference to advertising or other business, should be addressed to

AMERICAN JOURNAL OF OPHTHALMOLOGY, 7 West Madison St., Chicago, Ill.

HOSPITAL STANDARDIZATION.

The medical press has devoted considerable space of late to the problems of "hospital standardization." Even in some of the largest cities, hospitals have been found where little or no attempt has been made to bring the standard up to the average. In the smaller cities the chief complaint has been poor equipment, lack of laboratory facilities, absence of case records of any value.

Hospital standardization means two things—a proper diagnosis and treatment and a proper record of this diagnosis and treatment. To obtain these it is essential that the hospital furnish the equipment and the physician the inclination to make use of this equipment.

Ophthalmology has always stood at the apex of advanced medicine. Its importance as a specialty cannot be minimized when its broad application to medicine, especially in diagnosis, is considered. With a few exceptions, ophthalmology, as practiced in America, is not by any manner of means as high class as it should be. Visit our best clinics and watch the operations.

Do you hear a complete report on the blood, the urine, the general physical condition of the patient before operation? Do you see roentgenograms of the teeth, the laboratory report on the flora found in the smear of the conjunctiva? In glaucoma operations, have you heard the operator report on the metabolism, the kidney function, the blood pressure? In squint operations, has the muscle strength been tested? In cataract operations, do you hear anything about possible etiologic factors? And so on.

How many clinics bring in a series of cases such as glaucoma, iritis, cataract, choroiditis, even conjunctivitis and keratitis? Medical cases surely exist in these centers. Possibly the visiting surgeon does not care to see such cases, but certainly they should be shown.

If this is true in the larger centers, what shall we say of the smaller centers and of the hospitals where no teaching is attempted?

Group medicine has improved conditions somewhat; but so few members of the profession are associated in group practice, that one need not con-

sider that feature as of present benefit. Ophthalmology is probably cleaner in all respects (barring of course the glass problem) than any other specialty, chiefly because most hospital cases are surgical. Medicine, however, is the great field for future advancement in ophthalmology, and with hospital facilities furnished, great strides in this direction may be confidently expected.

What has all this to do with hospital standardization? Just this: In the standardized hospital the case record of the specialist will be reviewed by surgeons, internists, or specialists in another branch. A man will not be permitted to operate indiscriminately on any sort of case, unless he can show the reason and justification of operation. He will have to show what condition is present in a given case. In other words, the time is at hand when he will be checked up on his work.

This will apply to the internist who fails to have the eyes examined when essential for a diagnosis, or the surgeon who neglects a Wassermann or ocular examination in brain cases, or the mastoid case that goes wrong. The light of investigation is beginning to shine. We, as ophthalmologists, will again lead the way if we but seize this opportunity to aid in diagnosis, aid in technic, aid in criticism of poor methods and habits. Are we equal to the occasion? Membership in the various societies, certificates of efficiency or degrees in ophthalmology will not be sufficient protection for the man who fails to meet the requirements of the standard hospital. Each must stand upon his own legs and answer for his success or failure. This, then, offers to the medical profession something that has never before been possible—individual responsibility.

G. W. SWIFT.

A BASE LINE FOR OCULAR MEASUREMENTS

It has been customary to refer the various meridians of astigmatism or the visual fields to the supposed horizontal line joining the centers of the two eyeballs, or of the pupils or nodal

points of the two eyes. If the eyes were fixed in position like a telescope such a reference to the horizon might be adequate and satisfactory. But the eyes are not fixed as to the relation of any such line to the horizon. What is called the horizontal meridian can be made horizontal by placing the head in a certain position, and is assumed to be horizontal when the head is in the "primary" position.

But in point of fact the head is very rarely in the primary position. Even when it is in that position in some persons a line joining corresponding points of the two eyes would depart considerably from the horizontal. The 180° or "horizontal" meridian to which we refer the axes of lenses, is only horizontal accidentally, and at best is a line difficult to locate, and still more difficult for any two observers to exactly agree upon.

In view of these facts attention should be paid to the suggestion of Dr. Olsho in this issue (p. 481), that a line which can be identified and exactly located on any face by any number of observers should be adopted as the practical base line, representing this theoretic 180° meridian and to this the different meridians of the eye should be referred. By a slight adjustment of the head it can be made strictly horizontal in any case; and when it is made horizontal the head will not depart materially from the exact "primary" position, except in a few cases. On the other hand, the practical advantage of taking a line that can be readily identified by either prescriber or optician will far outweigh any disturbance of our indefinite conceptions of a theoretic plane perpendicular to the long axis of the body, and therefore assumed to be horizontal.

To get full practical benefit from referring to the line joining the two outer canthi as the 180° meridian, there needs to be some general consensus with regard to this being meant whenever a record is made of the refraction; or a prescription for glasses written or filled. It would be proper to hasten the adoption of this standard meridian

by formal action on the part of larger associations of oculists, and its acceptance by similar organizations of opticians.

This plan of locating the 180° meridian would be of equal advantage in fixing the meridians for the field of vision. It would serve every practical purpose to recognize this line joining the canthi as the horizontal meridian, which could be made and kept horizontal as accurately as any theoretic line; and more easy to keep in position by simple inspection, than by any biting fixation or other elaborate method.

To adopt this suggestion does not necessitate the use of any special trial frame; altho Dr. Olsho's suggestions and arguments for the form he describes are worthy of close attention. Any trial frame can be distinctly marked with its 180° meridian, and then the essential thing is to see that these marks fall on the line joining the outer canthi, even by holding the edge of a card or ruler to them.

In similar fashion a marker can be attached to any perimeter that will enable the surgeon to accurately orient the patient's eye from time to time thruout the examination of the visual fields, with the certainty that any other day the eye can be brought to the same position.

E. J.

INTERNATIONAL CONGRESS ON OPHTHALMOLOGY

At the meeting of the American Ophthalmological Society, June 16th, the Committee from that Society to assist in planning for such a Congress made its report; which was approved, and the committee was continued to aid in carrying forward the arrangements proposed. Similar action was taken by the Section on Ophthalmology of the American Medical Association in April; and the Committee of the American Academy of Ophthalmology and Oto-Laryngology had already received authority to cooperate fully in the movement. The project is therefore fully launched, and its organization has advanced far enough to in-

vite the cooperation and support of ophthalmologists thruout the world.

Invitations will be extended to national ophthalmologic societies in countries with which the United States now has diplomatic relations; and to individual ophthalmologists thruout the world to cooperate in preparation for the meeting and to attend its sessions. American ophthalmologists are asked to take the lead in giving their support; and any who are planning to go abroad can assist in spreading information with regard to the meeting which is to convene in Washington about the end of April, 1922.

Applications for membership in the Congress should be sent, with the membership fee of ten dollars, to the Chairman of the Committee on Membership and Credentials, Dr. Walter R. Parker, David Whitney Building, Detroit, Michigan. Suggestions regarding topics to be discussed, and offers of papers or material for a scientific exhibit, should be sent to the Chairman of the Committee on Scientific Business, Dr. Edward Jackson, 318 Majestic Building, Denver, Colorado.

The Chairman of the Committee on Organization, Dr. Edward C. Ellett, of Memphis, Tenn., will be assisted by members of his committee representing different sections of the United States, and other American countries. This Committee will be completed as rapidly as possible, and its membership announced later. Dr. William H. Wilmer, of Washington, D. C., has been made Chairman of the Committee of Arrangements; and Dr. Lee Masten Francis, of Buffalo, the Chairman of the Committee on Finance. Thru the latter, financial support apart from the fee may be tendered. It is proposed to remit the dues of those from outside of America who make the journey to attend the Congress; and to furnish the Transactions to foreign members at cost. To properly carry thru the work of the Congress, and entertain in a fitting manner our foreign guests in this era of high prices, will require both a large membership in America, and additional fi-

financial assistance from those who can give it.

The time for preparation is short enough. Let us push forward as rapidly as possible along the lines indicated in our previous reference to this subject, page 384 of our May issue.

E. J.

SUSPENDED JOURNALS

In its issue for May-June, 1918, the *Centralblatt für praktische Augenheilkunde* referred to the consolidation of ophthalmic journals in England and America that had occurred during the war. Then it rehearsed with evident pride the list of seven German periodicals devoted to ophthalmology, all of which were being continued. But with the December, 1919 number, the *Centralblatt*, itself, suspended publication after a career of 43 years, giving as the reason the enormously high cost of paper and printing which had increased 475 per cent since the beginning of the war, and was still rising.

At the close of the war it was announced that the publication of "Nagel's Jahresbericht," which had been suspended since 1914, would be resumed, and that a single volume covering the period of the war was in process of preparation. Now we are informed that, when this volume has been issued, the publication of the *Jahresbericht* will be given up, after serving the profession for a period of 44 years. It has been urged that our own Ophthalmic Year Book [which is now sent out under the title *Ophthalmic Literature* to meet the views of the Post Office Department in regard to the naming of periodical publications entitled to second-class entry] should assume more nearly the form of the defunct "Jahresbericht." But this is a matter that requires further consideration and discussion.

Whether the giving up of an ophthalmic journal is to be desired depends on the purpose of the journal, and the view that is taken of its importance. If a journal is published as a memorial to some man, like Graefe's *Archiv*, or to furnish opportunity to a

certain group of men to get their papers published, as are certain sectarian medical journals, or to advertise a particular institution or medical center, the continued publication of the separate journal is essential to the purpose. But if a journal is intended to furnish its readers with the widest and most complete survey of the literature in which they are interested, mergers and consolidations are in every way desirable. Because in this way it is possible to avoid duplication, systematize the literature that must be consulted with reference to any particular point, effect economy in the production and distribution of the literature, and strengthen the combined journal, so that it may be fitted to supply a higher grade of service.

E. J.

CONDITION OF OPHTHALMOLOGISTS ABROAD.

The condition of affairs with our special part of the medical profession, in the former enemy countries, is very bad indeed. But, perhaps not as terrible as that of the general populace. According to recent correspondence, the physicians and their families have suffered the effects of improper diet, with the rest.

Dr. M. Ohlemann of Wiesbaden, writes May 9, 1920, of the effects of malnutrition—the "blockade disease," as they denominate it—causing rickets, even in the old, as in the case of his wife, who suffered fractures of the femur and clavicle, simply from turning over in bed.

Dr. J. Fejer of Budapest, writes May 8, 1920, of the pitiable condition of the hospitals, with no absorbent cotton, antiseptics or bandages; the impossibility of obtaining cocaine, atropin, pilocarpin, or nitrat of silver, and earnestly desires contributions for his poor patients, who go blind in his hands without the materials for relief.

Prices are very high. A pair of spectacles now costs five to six hundred crowns. "Happy U. S. people who know nothing of such a life and who

do not have to share this miserable lot."

Others of our correspondents have succeeded in getting away from their homes, like Professor Fuchs of Vienna, leaving most of his possessions, who is now in Spain; earning his bread by giving lectures, where at least the bread is nutritious and not a substitute ("ersatz") product. H. V. W.

BOOK NOTICES

Card Test for Color Blindness. F. W. Edridge-Green, M.D., F.R.C.S. London: G. Bell and Sons, Ltd.

This test consists essentially of 24 cards printed in colors and eight pages of explanatory text, the whole included in a neat pocket case, $5\frac{1}{4}$ by 6 inches in size and one-half inch thick. It is offered as a simpler and less expensive test than its author's color lantern.

On each card are printed splotches of the colors in different shades and tints. The patches of color have the same shape and arrangement on all the cards. The colors chosen for each card are those which the sufferer from some variety of color blindness will confuse. One of the colors is arranged so as to form a letter, the other color constitutes a back-ground. There is no way to recognize the letter except by the differences of color.

One card after another is shown and the failure to see the figure against the background of confusion color indicates the particular form of color blindness that card is designed to disclose.

As a cheap, portable and apparently reliable test this one is most welcome.

E. J.

Anneseley Burrowes. What it is Like to be Blind.—Saturday Evening Post, Mar. 13, 1920.

All who have not, are recommended to read this article in the original, as an insight is there given from the patient's side of the sensations from the loss of sight, and of the gradual development of the blind man's senses. It is written by a gifted writer, a student of human nature, and a philoso-

pher who has accepted his calamity in a remarkable spirit; and not only makes the best of the senses he has left, but has achieved an enviable position in his profession of writing.

Mr. Burrowes had a high degree of myopia in both eyes. His father and mother were evidently very myopic, and he thus came by this condition naturally. One of his eyes suddenly went blind while in a boat which he used as a work shop. The patient was using a typewriter when "something thick and green edged out like a drop-curtain taking two hours to fall. The color faded out, becoming gray with occasional lapses into other colors and he never saw out of that eye again." This was probably a detachment of the retina, happening as it does in about fifteen per cent of highly myopic cases. He went along with the other eye for a number of years, the sight gradually becoming poorer from the development of lenticular opacities, undoubtedly associated with degenerative changes in the fundus.

When his sight became very poor, he submitted to an extraction of cataract in Chicago, evidently an expression in the capsule, which in the moment of operation was apparently a success; but when dressings were made the surgeon gave no hopes for sight. The patient submitted to a number of operations later, probably an attempt to make a pupil, but all with no result.

Of great interest is his description of his orientation to his new environment of practically total blindness, and of what he was able to do; how he got about, his sense of direction and of position of obstacles in his path. His experiences with other blind men, and his own happy description, show that the blind become content and lead a more happy life than others do with different afflictions. The deaf are customarily less happy and even morose, for they have a smaller world in connection with their fellow creatures; they cannot hear what other people are saying and they cannot communicate their thoughts as freely to others; whereas the blind are deprived of communication with their fellow creatures

practically only by the printed page, and they make up for this in part by the reading of Braille and by having people with sight read to them. On the whole this communication is not only an item of human interest but will give to the oculist a side light that he seldom acquires from his patients.

There are but few descriptions of blindness in literature; we may remember "The Light That Failed" by Kipling, and "The Lane That Hath No Turning" by Parker,—novels dealing in large part with persons who became blind thru glaucoma. H. V. W.

CORRESPONDENCE

The Clinic of Col. Henry Smith.

To the Editor:

In August, I left Bangkok, Siam, where I had been practicing for a number of years, to pay a visit to the Clinic of Col. Henry Smith of India.

In September I arrived at Madras and called on Col. Kirkpatrick, who is now in charge of Col. Elliot's Hospital and Clinic.

I arrived at Amritsar about the first of October, and found Colonel Smith at home having just returned from the Front in Mesopotamia. The Colonel has two cataract seasons a year. One in the Spring just before the hot season sets in, beginning the first of March and lasting about eight weeks; and, another about the beginning of October to the middle of November.

During these two seasons the natives come in droves from all over the Punjab to be operated upon for cataract. During the two seasons the Colonel will do between two and three thousand intracapsular cataract extractions. Up to date he has done around 50,000 intracapsular extractions.

Colonel Smith is a Dublin University man and a fine scholar. He is an indefatigable worker and a great student. His hospital is an institution of 300 beds requiring considerable personal administrative attention. He has several native clerks, but his surgical staff consists of his personal assistant, Neuralai; one native surgeon and

a European nurse. The Colonel has a wonderful capacity for work. One day I saw him do 45 cataract extractions; 3 iridectomies, 2 trephining for glaucoma and some general surgery. To prevent his work from piling up he operates every day except Sundays; from eleven in the morning until three in the afternoon. He has three tables in his operating room which are constantly in use.

The Colonel is also a general surgeon of very high ability and does not confine himself to eye surgery alone. I have seen him do three operations for stone in the bladder one afternoon besides his usual number of eye operations. He never uses the knife in operating for stone. He says it is barbarous to use the knife. He is most skillful in the use of the lithotrite. Nearly all of his stone cases go home the same day that they have been operated. One day he operated on two cases for extrauterine pregnancy. During my visit he did two Caesarean Sections. One forenoon he performed 3 postmortems. Hernia operations are one of his many specialties. I marveled at his versatility. He does everything. There is hardly an operation in the whole field of surgery that the Colonel does not frequently perform in his Clinic.

The Intracapsular Operation for Cataract has made him known the world over. He has aimed to make it the ideal operation for senile cataract. Upon these Indian natives it is the one ideal operation. There are no capsular remains. He seldom has a secondary or an aftercataract develop. His pupils are black and clear. He extracts a couched or dislocated lens with the same ease as an ordinary senile cataract. If there is any loss of vitreous he seldom has any bad effects. He removes the bandage for the first time on the ninth day and allows the patient to go home on the next day.

The Colonel operates upon his cataract patients immediately after they have been seen by him. The native of the Punjab will not submit to a lengthy preparation. If he were to be told to come into the hospital and wait

two or three days for preliminaries he would walk away and go back home. Knowing the natives of India and their poverty and superstition, one can readily understand why Colonel Smith operates upon them the very day they arrive.

He operates on both eyes at once; bandages the eyes, and then does not disturb the dressings by inspecting the wound on the second day, as is so commonly done, but gives the eyes nine days to heal up thoroly before he removes the bandage. He is too busy, and, again it would take hours of his time daily to inspect and change the dressings of all these cases. He strongly believes in giving the wound a good chance to heal up thoroly before disturbing the dressing for inspection. He is not ambidextrous but operates on both eyes with his right hand.

The patients sit upon the floor of the operating room by the score and await their turn. There are only a few preliminary preparations. The patients' lashes are trimmed. The parts are washed with soap. The conjunctival sacs are flushed with a stream of bichlorid solution 1-4000 from a jar about four feet overhead. He uses 3 instillations of 5% cocain solution. This is all the preparation the average patient gets.

The Colonel does not worry his patients with much conversation and orders to look up and down. He operates silently and finishes before the patient has had time to grow nervous.

As a teacher he is painstaking and thoro, and aims to teach his pupil every step of the intracapsular operation. Under the Colonel's guidance he is allowed to operate on the living subject. There are no pig's eyes for demonstrations. His Clinic is the only place where they demonstrate on the living subject.

Col. Henry Smith is one of the foremost men in the Indian Medical Service. His extensive work for the past thirty-five years has made him known throughout the World; but, none know him better than the native Punjabi, among whom he has lived as

friend and beloved physician all these years.
CHARLES C. WALKER.
Detroit, Mich.

AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS.

In addition to the list published in the January number (p. 74) the certificate of the Board has been granted to the following:

Bahn, Charles A., New Orleans, La.
Bordley, James, Jr., Baltimore, Md.
Brooks, Earl Brisbin, Lincoln, Nebr.
Brose, Louis D., Evansville, Ind.
Calhoun, James G., St. Louis, Mo.
Chance, Burton, Philadelphia, Pa.
Dimitry, Theodore J., New Orleans, La.
Dowling, J. Ivey, Albany, N. Y.
Ellett, Edward C., Memphis, Tenn.
Foster, Matthias L., New Rochelle, N. Y.
Gantt, L. Rosa H., Spartanburg, S. C.
Graham, R. Watson, Los Angeles, Cal.
Green, John, Jr., St. Louis, Mo.
Hardy, Wm. Frederic, St. Louis, Mo.
Heckel, Edward B., Pittsburgh, Pa.
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Jean, George William, Santa Barbara, Cal.
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Satterlee, Richard H., Buffalo, N. Y.
Searcy, Harvey Brown, Tuscaloosa, Ala.
Snow, L. W., Salt Lake City, Utah.
Teal, Frederick F., Lincoln, Nebr.
Thomas, Jerome B., Palo Alto, Calif.
Vinsonhaler, Francis, Little Rock, Ark.
White, Joseph A., Richmond, Va.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS.

H. B. Hill, of Logansport, Ind., died May 20th. He was 54 years of age and practiced ophthalmology and otolaryngology for over 25 years.

James H. Spencer, Tacoma, Washington, aged 58 years, for several years a specialist in the U. S. Indian service at Ashland, Wis., died at Santa Cruz, Calif., May 13th, from chronic interstitial nephritis.

SOCIETIES.

Dr. Verhoeff, of Boston, read a paper before the Louisville Eye and Ear Society at its June meeting, on "Some of the New Cataract Operations."

The Nevada State Medical Association will hold their annual meeting at the Tavern, Lake Tahoe, California, on June 25-26. An attractive program has been arranged and some of the leading men of San Francisco will take part.

The Chicago Medical Society and the Chicago Ophthalmological Society held a joint meeting on May 26th, at which Dr. Dwight Orcutt read a paper on "The Importance of Early Treatment for Strabismus," and Dr. Richard Tivnen, one on "Preventable Blindness," illustrated by lantern slides.

The Canadian Medical Association met this year on June 22-25, at Vancouver, B. C. The program of the Section on Ophthalmology and Oto-laryngology contained five papers on ophthalmologic subjects, two of which were on the use of radium. The morning of June 23rd was devoted to this session.

An Eye, Ear, Nose and Throat Section of the Buchanan County Medical Society was organized at St. Joseph, Mo., March 10th. Dr. P. L. Leonard was elected chairman and Dr. W. L. Kenny, secretary of the Section.

The Colorado Congress of Ophthalmology and Oto-laryngology will be held in Denver, Colo., July 23rd and 24th, 1920. The list of papers relating to Ophthalmology includes: "Delirium Following Cataract and Other Eye Operations," Wm. A. Fisher, Chicago, Ill.; "Hints in Relation to the Dynamics of the Extrinsic Ocular Muscles, with Suggestions as to the Treatment of States of Muscular Imbalance," John M. Banister, Omaha, Neb.; "The Value of Dental Examination in the Treatment of Ocular Disorders," Wm. L. Benedict, Rochester, Minn.; "Accidents Occurring During the Extaction of Cataract," H. W. Woodruff, Joliet, Ill.; "Iodin in the Treatment of Intraocular Hypertension, with Presentation of Tonometer," Edward J. Brown, Minneapolis, Minn.; "Some Optical

Imperfections of the Eye, and Some of Their Uses," Henry Sewall, Denver, Colo.; "Visual Fatigue," Edward Jackson, Denver, Colo.

PERSONAL.

Dr. A. G. Hovde, of Superior, Wis., who has been sojourning in California during the fall and winter, has returned to his practice at Superior.

Dr. E. M. Myers, of Wakefield, Kan., has removed to Superior, Wis., where he is now associated with Drs. Hovde and Smith.

Dr. O. Dulaney and Dr. J. D. Brewer announce their association in the practice of eye, ear, nose and throat diseases, in Dyersburg, Tenn.

Dr. D. L. Shaw, formerly house surgeon at the Royal London Ophthalmic Hospital of London, England, has located in Reno, Nevada.

Dr. Burton Chance, Philadelphia, has removed his office to 1305 Spruce street.

Dr. Nelson M. Black and Dr. V. A. Chapman, of Milwaukee, have dissolved their partnership and each will continue the practice of ophthalmology and oto-laryngology individually in the same city.

Dr. Wesley Hamilton Peck, formerly president of the ophthalmic section of the Illinois State Medical Society, was presented with a silver loving cup at the Rockford meeting in May as an appreciation of his efforts in behalf of the section. Dr. Willis O. Nance made the presentation address.

MISCELLANEOUS.

The Summer Course in Ophthalmology under the auspices of the Medical Department of the University of Colorado, began June 14th in the Medical Building in Denver. The course will extend over a period of six weeks.

The State Board of Health of Indiana has been advised that two men, Dr. Harper and Dr. Van Camp, are representing themselves as their agents. They are testing the eyes of children whom they secure in the name of the State Board of Health. According to Dr. John N. Hurty, secretary of the State Board, neither of the men is a representative of the State Board, and a warning is issued against them.

It is announced that the Centralblatt für Augenheilkunde, founded and edited by Prof. J. Hirschberg for forty-three years, is to suspend publication. Michel's (formerly Nagel's) Jahresberichte über die Leistungen und Fortschritte im Gebiete der Ophthalmologie is also to stop publication with 1920. The back numbers from 1914 are to be made up to the current year.

OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceeding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colo.

DIAGNOSIS

- Birley, J. L.** Medical Science Applied to Military Aviation. *Lancet*, June 12, 1920, p. 1251, 1257.
- Ferree, C. E., and Rand, G.** Visual Acuity at Low Illumination. Detection of Small Errors of Refraction. (4 ill.) *Amer. Jour. Opth.* v. 3, p. 408-417.
- Gallemaerts and Kleefeld.** Observations with Gullstrand's Lamp. *Belgian Opth. Soc. Nov. 30, 1919. Amer. Jour. Opth.* v. 3, p. 364.
- Holloway, T. B.** Pupillometer. *Amer. Jour. Opth.* v. 3, p. 381.
- Jackson, E.** Pseudo Tumors of Uveal Tract. (1 ill. 1 col. pl. Bibl.) *Amer. Jour. Opth.* v. 3, p. 397-402, and p. 464.
- Koeppe, L.** Findings with Improved Illumination of Eye. *Munch. med. Woch.*, v. 67, p. 39.
- Morse, S.** Fundus Examination as Evidence of General Disease. *New York Med. Jour.* v. 111, 1920, p. 1034-1037.
- Redding, L. G.** The Ophthalmoscope in Diagnosis and Prognosis. *Jour. A. M. A.*, v. 74, p. 1731.
- Ribon, V.** Differential Diagnosis of Meningitis by Eye Findings. *Siglo Med.* v. 67, 1920, p. 86.
- West, L. N.** Eye as an Aid in Diagnosis of Intracranial Lesions. *New Albany Med. Herald*, May, 1920, p. 105.

THERAPEUTICS.

- Janeway, H. H.** Therapeutic Use of Radium in Eye Disease. (Bibl.) *Arch. of Opth.* v. 49, 1920, p. 174, and 238.

OPERATIONS.

- Landolt.** Improvement of Our Surgical Armamentarium. *Belgian Opth. Soc. Nov. 30, 1919. Amer. Jour. Opth.* v. 3, p. 363.
- Maynard, F. P.** Manual of Ophthalmic Operations. 2nd ed. 8 vo. Ill. with Stereoscopic plates. Calcutta: Thacker and Spink.

REFRACTION.

- Champlin, H. W.** Refraction Under Prolonged Fogging with a Minimum of Cycleplegics. *Jour. Opth. Otol. and Laryngol.* May, 1920, p. 176-181.
- McDall, E. B.** Speed of Accommodation. *Air Med. Service*, v. 1, 1920, p. 70-76.

- Harman, N. B.** Cycloplegia in Routine Refraction Work. *Brit. Med. Jour.* May, 1, 1920, p. 598-600.
- Howard, H. J.** New Apparatus for Testing Accommodation. (8 ill.) *Arch. of Opth.* v. 49, 1920, p. 182-190.
- Sonder.** Influence of Diseases in Children on Progressive Myopia. *Arch. d'Opht.* v. 37, p. 290-298.
- Terson.** Refraction and Central Scotoma. *Soc. d'Opht. de Paris*, March, 1920. *Arch. d'Opht.* v. 37, p. 316.
- Whitwell, A.** Frame Power of a Lens. *Amer. Jour. Physiol. Optics*, April, 1920, p. 187-183.

OCULAR MOVEMENTS.

- Argañaraz, R.** Cerebral Nystagmus. (5 ill. Bibl.) *Arch. de Oftal. Hisp.-Amer.* v. 20, 1920, p. 105-136.
- Buchanan, J. N.** Two Methods of Applying Prism Test to Eyes. *Air Service Medical*, v. 1, 1920, p. 65-70.
- Cantonnet, A.** Ocular Ataxia in Tabes. *Presse Med.* v. 28, 1920, p. 156.
- Comby, J.** Headshaking with Nystagmus in Children. *Arch. de Méd. des Enfants* v. 23, 1920, p. 303. *Abst. Jour. A. M. A.*, v. 74, 1920, p. 1745.
- Crisp, W. H.** Bilateral Abducens Paralysis. (Dis.) *Amer. Jour. Opth.* v. 3, 1920, p. 378.
- Crouzon and Behague.** Congenital and Familial Ophthalmoplegia. *Bull. de la Soc. Méd. des Hopitaux*, v. 44, 1920, p. 372. *Jour. A. M. A.*, v. 74, 1920, p. 1746.
- Dolman, P.** Maddox Multiple Red Rod. Consideration of Some of Its Optical Defects. *Arch. of Opth.* v. 49, 1920, p. 194-197.
- Duane, A.** Routine in Examining Cases of Squint. *New York State Jour. Med.* v. 20, p. 181-187.
- Hoeve, J., van der.** Latent Nystagmus. *Arch. d'Opht.* Dec., 1917. *Abst. Brit. Jour. Opth.*, v. 4, p. 289.
- Howard, H. J.** A Stereomicrometer. (6 ill.) *Amer. Jour. Opth.*, v. 3, p. 417-421.
- Lafon, C.** Nystagmus. *Ann. d'Ocul.* v. 157, 1920, p. 209-236.
- Landolt.** Binocular Vision. *Soc. d'Opht. de Paris*, Feb., 1920. *Ann d'Ocul.*, v. 157, 1920, p. 245.
- McDavitt, T.** Homonymous Diplopia. *South-ern Med. Jour.*, v. 13, p. 378-380.

- Maddox, E. E.** The Rod Screen Test. *Arch. of Ophth.*, v. 49, 1920, p. 229.
- Rutten.** Occupational Nystagmus of Miners. *Belgian Ophth. Soc.*, Nov., 1919. *Amer. Jour. Ophth.*, v. 3, 1920, p. 368.
- Sauvigneau, C.** Cerebral Origin of Strabismus. Treatment by Complementary Colored Glasses. *Jour. Ophth. Otol. and Laryngol.*, June, 1920, p. 236.
- Strickler, D. A.** Paralysis of Motor Oculi; Sudden Recovery. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 375.
- Suffa, G. A.** Synergism or Cooperative Action of Extraocular Muscles. (Dis.) *Jour. Ophth. Otol. and Laryngol.* June, 1920, p. 206.
- Sykes, E. M.** Effect of Certain Intranasal Conditions Upon Extrinsic Muscles of Eye. *Texas State Jour. Med.*, v. 16, 1920, p. 10-12.
- Thomson, E. S.** Treatment of Muscular Anomalies. *New York State Jour. Med.*, v. 20, 1920, p. 178.
- Viterbi, A.** Traumatic Neuroses and Heterophoria. *Arch. di Ottal.*, v. 25. *Abst. Arch. d'Ophth.*, v. 37, p. 306.
- White, J. W.** Tenotomy of Inferior Oblique. *New York State Jour. Med.*, v. 20, 1920, p. 156.
- Turner, H. H.** Transplantation of Superior and Inferior Recti Fibres for Convergent Strabismus. (3 ill.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 441.
- Merida, N.** Trachoma in Malaga; Geographic Distribution. (3 maps, Bibl.) *Arch. de Oft. Hisp.-Amer.*, v. 20, 1920, p. 62-96.
- Morton, H. Mcl.** Hyperplastic Subconjunctivitis. (2 ill. Bibl.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 402-406.
- Myashita.** Secretions in Conjunctivitis. *Nippon Gank. Zasshi*, July, 1919.
- Ophthalmia Neonatorum.** *Brit. Jour. Ophth.*, v. 4, 1920, p. 288.
- Strader, G. L.** Rapid Cure of Gonorrheal Ophthalmia. *Amer. Jour. Ophth.*, v. 3, p. 454.
- Watanabe.** Radical Treatment of Trachoma. *Nippon Gank. Zasshi*, July, 1919.

CORNEA AND SCLERA.

- Bonnefon.** Scrofulous Keratitis of Vascular Type. *Jour. de Méd. de Bordeaux*, v. 91, p. 173. *Abst. Jour. A. M. A.*, v. 74, p. 1608.
- Fuchs, E.** Keratitis Profunda Provoked by Abnormal Composition of Aqueous Humor. (4 ill.) *Arch. de Oft. Hisp.-Amer.*, v. 20, 1920, p. 49-58.
- Fuwagawa, Y.** Megalocornea. *Nippon Gank. Zasshi*, July, 1919.
- Goldschneider and Bruckner.** Sensitiveness of Cornea. *Berl. klin. Woch.*, v. 56, 1919, p. 1225.
- Green, A. S., and Green, L. D.** Operation for Keratoconus with Report of Two Cases. (9 ill.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 429-432.
- Harrington, R. R.** Coloboma of Sclera and Hernia of Choroid. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 372.
- Kleefeld.** Color of Corneal Ulcers with Gullstrand Lamp. *Belgian Ophth. Soc.*, April, 1920.
- Libby, G. F.** Kerato-iritis of Traumatic Origin. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 374.

ANTERIOR CHAMBER AND PUPIL.

- Cockroft, W. L.** Loewi's Epinephrin Mydriasis as Sign of Pancreatic Insufficiency. *Brit. Med. Jour.*, May 15, 1920, p. 669. *Abst. Jour. A. M. A.*, v. 74, p. 1743.
- Dunn, J.** Pupillary Symptoms in Embolus of Central Artery of Retina. *Arch. of Ophth.*, v. 49, 1920, p. 191-193.
- Lindberg, J. G.** Heterochromia of Iris. *Finska Läk. Handl. Helsingfors*, v. 62, 1920, p. 231.
- Shields, J. M.** Dust Like Persistent Pupillary Membrane. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 377.
- Strader, G. L.** Cyst in Anterior Chamber. *Amer. Jour. Ophth.*, v. 3, 1920, p. 448.

UVEAL TRACT.

- Bane, W. C.** Iridodonesis with Lens Opacities. *Amer. Jour. Ophth.*, v. 3, 1920, p. 453.
- Browning, S. H.** Radical Cure of Gonorrheal Iritis. *Roy. Soc. Med. Sec. on Ophth.*, Feb., 1920. *Amer. Jour. Ophth.*, v. 3, p. 438.
- Buxton, L. H.** Trachoma. *Southwest. Jour. Med. and Surg.*, v. 28, 1920, p. 56.
- Coutard and Offret.** Treatment of Follicular Conjunctivitis with X-Rays. *Ann. d'Ocul.*, v. 157, 1920, p. 240-244.
- Demaria, E. B., and Parodi, S. E.** Penicillium Glaucum in Human Conjunctiva. (1 ill.) *Arch. de Oft. Hisp.-Amer.*, v. 20, 1920, p. 58-62.
- Eaton, F. B.** Field Investigation of Etiology of Trachoma in Eastern Kentucky. *Amer. Jour. Ophth.*, v. 3, 1920, p. 422-426.
- Friede.** Scrofulous Conjunctivitis. *Vienna Ophth. Soc.*, May, 1919. *Arch. de Oft. Hisp.-Amer.*, v. 20, 1920, p. 139.
- Gabrielides, A.** Etiology of Vernal Conjunctivitis. *Ann. d'Ocul.*, v. 157, 1920, p. 273-286.
- Guzman.** Tuberculosis of Conjunctiva. *Vienna Ophth. Soc.*, May, 1919. *Arch. de Oft. Hisp.-Amer.*, v. 20, 1920, p. 139.
- Hiwatari, K.** Initial Development of Papillary Bodies in Human Conjunctiva. *Arch. of Ophth.*, v. 49, 1920, p. 283-286.
- Kirkpatrick, H.** Magnesium Sulphate as Local Application in Inflammation of Conjunctiva and Cornea. *Brit. Jour. Ophth.*, v. 4, p. 281.
- Lockhart, R.** Diagnosis and Treatment of Trachoma. *Ohio State Med. Jour.*, v. 16, 1920, p. 262.
- Macfie, J. W. S.** Xerophthalmia. *Ann. of Trop. Med. and Parasitol.* Liverpool, v. 13, 1920, p. 343. *Short abst., Jour. A. M. A.*, v. 74, p. 1743.

- Carreras, B.** Heterochromia of Iris. *Los Prog. de la Clin.*, April 30, 1920, p. 259.
- Gifford, S. R.** Recurrent Iritis with Dermatitis Exfoliativa. *Amer. Jour. Ophth.*, v. 3, 1920, p. 433.
- Holloway, T. B.** Bilateral Colobomata of Iris and Choroid. *Amer. Jour. Ophth.*, v. 3, 1920, p. 380.
- Jackson, E.** Pseudo Tumors of Uveal Tract. (1 ill. 1 col. pl. Bibl.) *Amer. Jour. Ophth.*, v. 3, p. 397-402, and 464.
- Chronic Tuberculosis of Choroid. (1 col. pl.) Contributions to Med. and Biol. Research Dedicated to Sir Wm. Osler, 1919, p. 616-620.
- Magruder, A. C.** Iridocyclitis. *Amer. Jour. Ophth.*, v. 3, 1920, p. 377.
- Mazzei, A.** Action of Various Extracts on Iris of Dogs. *Arch. di Ottal.*, v. 25. *Abst. Arch. d'Ophth.*, v. 37, p. 307.
- Roll, G. W.** New Formed Vessels on Iris. *Roy. Soc. Med. Sec. on Ophth.*, Feb., 1920. *Abst. Amer. Jour. Ophth.*, v. 3, p. 437.
- Walker, C. E.** Dental Causation of Obsolete Iritis. *Amer. Jour. Ophth.*, v. 3, p. 452.
- SYMPATHETIC DISEASE.**
- Goto.** Metastatic Ophthalmia. *Nippon Gank. Zasshi*, July, 1919.
- Thompson, H. M.** Sympathetic Iridocyclitis. (Dis.) *Amer. Jour. Ophth.*, v. 3, 1920, p. 379.
- GLAUCOMA.**
- Baute, H.** Sclerocorneal Trephining of Elliot. *Paris Thesis*, 1919. *Arch. of Ophth.*, v. 37, p. 319.
- Brown, E. V. L.** Loss of Vision Despite Restoration of Normal Tension. *Amer. Jour. Ophth.*, v. 3, 1920, p. 442.
- Trephining by Purtscher's Method. *Amer. Jour. Ophth.*, v. 3, p. 443.
- Butler, T. H.** A Tonometric Chart. (2 ill.) *Brit. Jour. Ophth.*, v. 4, 1920, p. 279-281. *Arch. of Ophth.*, v. 49, p. 227-228.
- Cousin, G.** Hydrophthalmia at Age of Fifteen. *Soc. d'Opht. de Paris*, Feb., 1920. *Ann. d'Ocul.*, v. 157, 1920, p. 245.
- Crisp, W. H.** Iridectomy for Glaucoma. *Amer. Jour. Ophth.*, v. 3, p. 453.
- Curran, E. J.** New Operation for Glaucoma Involving New Principle in Etiology and Treatment. (8 ill.) *Arch. of Ophth.*, v. 49, 1920, p. 131-155.
- Hambresin.** Two Cases of Glaucoma from Homotropin. *Belgian Ophth. Soc.*, Nov., 1919. *Amer. Jour. Ophth.*, v. 3, 1920, p. 367.
- Contributions to Trephining of Elliot. *Belgian Ophth. Soc.*, Nov., 1919. *Amer. Jour. Ophth.*, v. 3, 1920, p. 364.
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- McLean, W.** Tonometry of Glaucoma. (1 ill.) *Arch. of Ophth.*, v. 49, 1920, p. 301.
- Maghy, C.** Primary Acute Congestive and Subacute Glaucoma. *Amer. Jour. Ophth.*, v. 3, 1920, p. 444.
- Ohsaki.** Elasticity of Cornea and Eye Pressure. *Nippon Gank. Zasshi*, July, 1919.
- Peter, L. C.** Visual Fields in Glaucoma. (3 ill.) *Arch. of Ophth.*, v. 49, 1920, p. 309-315.
- Posey, W. C.** Etiology and Diagnosis of Glaucoma and its Control by Miotics. *Arch. of Ophth.*, v. 49, 1920, p. 293-300.
- Poulard, Juvenille** Glaucoma Treated with Sclerectomy. *Soc. d'Opht. de Paris*, March, 1920. *Arch. d'Opht.*, v. 37, p. 315.
- Rutherford, W. J.** Spontaneous Rupture of Glaucomatous Eye. *Brit. Jour. Ophth.*, v. 4, 1920, p. 282.
- Schiötz, H.** Tonometry. *Brit. Jour. Ophth.*, v. 4, 1920, p. 249-266.
- Sedwick, W. A.** Glaucoma Secondary to Iritis. *Amer. Jour. Ophth.*, v. 3, 1920, p. 448.
- Thibert, Traumatic** Glaucoma. *Belgian Ophth. Soc.*, Nov., 1919. *Amer. Jour. Ophth.*, v. 3, 1920, p. 361.
- Weeks, J. E.** Operative Treatment of Glaucoma. *Arch. of Ophth.*, v. 49, 1920, p. 316.
- CRYSTALLINE LENS.**
- Bane, W. C.** Posterior Polar Cataract. *Amer. Jour. Ophth.*, v. 3, 1920, p. 453.
- Coppez, H.** Phacoerisis. *Belgian Ophth. Soc.*, Nov., 1919. *Amer. Jour. Ophth.*, v. 3, p. 366.
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